

Thesis/
Reports
Bradshaw,
L.S.

Climate During Severe Fire Years

COOP

INT

E. Wood

189



United States
Department of
Agriculture

Forest
Service

Reply to: 4040 Cooperation

Date: May 30, 1984

Subject: Agreement INT-81-018-CA, Climate During Severe Fire Years

To: Director, INT
THRU: James E. Lotan, Program Manager

giml

18h

L

All planned work under the above designated research agreement has been completed. The agreement should be terminated following final billing by the cooperator, Systems for Environmental Management. A copy of the final report is enclosed.

William K. Brown

JAMES K. BROWN
Project Leader

Enclosure

cc: Larry Bradshaw

RECEIVED

JUN 4 1984

Intermountain Forest &
Range Experiment Station



Final Report

Cooperative Agreement Number

INT-81-018-CA

(Climate During Severe Fire Years)

Larry S. Bradshaw

Research Meteorologist

(Systems for Environmental Management)

May 1984

Preface

This report is submitted in fulfillment of section II, paragraph B of cooperative aid agreement INT-81-018-CA (amended) between the USDA, Forest Service, Intermountain Forest and Range Experiment Station, Northern Forest Fire Laboratory, Missoula, Montana, and Systems for Environmental Management, Missoula, Montana.

Beyond the stated objectives, a subtle message perpetuates that the results should allow detection of a potentially 'severe fire season' sometime in May or June so the whole question of the upcoming season can be put to rest. It will take more than \$5000 and my abilities to do that. People magnitudes more qualified than I have been working on the problem for years with no appreciable results. The total resources of the National Weather Service can still only predict weather one to two days in advance with relative accuracy; and three to five days in advance with moderate confidence. Monthly forecasts contain an abundance of wishful thinking. Climatic analysis can be helpful though and perhaps this is a start.

My objective in this study was to develop climatological profiles of past severe fire seasons-- the really severe seasons in the early part of this century when millions of acres burned. Because meteorological data for these times is available only at city, or airport locations, no comparisons can be made to the now active fire weather station networks. So, if you're interested in climatological profiles of severe fire seasons at several locations in Montana for selected years between 1910 and 1967, read on.

Introduction

Two objectives highlight this study:

- A. Describe the climate during past severe fire seasons in the Northern Rockies.
- B. Investigate similarities and differences between past severe Northern Rocky Mountain fire seasons using climatological and fire danger rating parameters.

Over the course of this study, two objectives were added and the completion date was twice extended. One added objective coincided with prescribed burning activities of the Fire Management Systems research work unit (2110). The second related to Climatology computer programs developed in a prior cooperative aid agreement. They are:

- C. Assist as reasonably requested in preparing data for climatic summaries for prescribed fire demonstrations areas in Glacier National Park; and the BLM districts of Elko, Nevada and Vail, Oregon.
- D. Revise Climatology programs to provide additional data selection options and format changes as requested by Arnold I. Finklin of the Northern Forest Fire Laboratory.

This report is divided into two sections. First is a quick summary of objectives C and D; second is a discussion of primary objectives A and B.

Objective 3 -- Prepare Climatic Summaries

Climatic Summaries for prescribed burning areas were only performed for the Glacier National Park burns. A summary of the day (Department of Commerce, National Climatic Center, Tape Deck 3100) data tape was purchased from Bozeman State University for the following stations:

| | | |
|--------------|---|--------------------------|
| Summit | - | Located near Marias Pass |
| West Glacier | - | NPS Headquarters |
| Polebridge | - | Climate Station |

The climatology programs (SUMMARY, PRECIP1, & PRECIP2) were altered to perform the following tasks:

Read the tape in its current format and check for missing values prior to generating summary tables, and

Summarize snowfall and snowdepth information in the same format as precipitation data

These runs were performed to the specifications of Arnold I. Finklin who subsequently worked them into a climatic summary for the Glacier Park Area. Mr. Finklin should be consulted for further information on the status of this particular report. If requested, this process will be repeated for the Vail and Elko areas.

Objective 4.

The climatology programs (SUMMARY, PRECP, PRECIP2 and WINDS) were modified according to the following requests from Arnold I. Finklin.

1) Programs PRECIP2 & SUMMARY - means, standard deviations and extreme values

a. Allow users to specify the minimum number of observations per 10-day period for including a period for mean and extreme value calculations. Default minimums will be 6 days/10-day period for the SUMMARY program and 8 days/10/-day period for PRECIP2.

b. do not require a minimum number of days per period for frequency distributions.

- In SUMMARY and PRECIP2, if HIGHEST or LOWEST 10-day period is based on less than complete 10 (or 11) days (but at least the default or user specified minimum), flag the period with the letter "M."

2) For MAXIMUM DAILY TEMPERATURE the observed value should be at least as high as the dry bulb temperature of the current day, or the prior (if there is no days missing) in the sequence.

Program WINDS & THREE-WAY

- Include option for printing only monthly summaries instead of both 10-day period and monthly.

Modifications in table formats on headings for SUMMARY tables

- print number of years of useable data for each 10-day period before the mean value column.

- Change heading on right from "10-DAY AND MONTHLY EXTREMES" to

"10-DAY AND MONTHLY EXTREME DAILY VALUES"

For Frequency Distribution Tables

- SUMMARY: Temperature and Relative Humidity - Insert "TEMPERATURE RANGE" or "HUMIDIY RANGE" above range values, and delete "BELOW 0" and "100 AND ABOVE" columns on the humidity table.

- PRECIP1: Insert "AMOUNT EQUAL TO OR GREATER THAN" above value line and delete the ">" symbols.

These changes, together with some formatting changes in the three averaging programs (AVERAGE1, AVERAGE2, AVERAGE3) were completed some time ago. The averaging program changes put more information on the output tables, which match tables 3, 4, and 5 in Arnold I. Finklins publication Summarizing Weather and Climatic Data -- A Guide for Wildland Managers.

All of the changes have been mapped into the SEM*CLIM file at the Fort Collins Computer Center, and are awaiting the "OK" from Cam Johnston prior to being mapped into the CSSG*R1LIB at FCCC.

Tables 13 and 14 in this report illustrate the new format of SUMMARY and PRECIP2. The upcoming Climatology User's Guide contains a complete set of examples of the climatology tables.

Objectives A and B -- Climate During Severe Fire Years

The first question that comes to mind in developing climatologies of severe fire season is obvious. What is a severe fire season? How is it different from a 'non-severe' season. Separate study would be required to objectively answer that question. Defining a severe fire season may be as difficult as predicting them in advance.

Is a severe season defined by the number of acres burned or by the total number of fires? Does the forest care? How about defining seasons in terms of total fire suppression costs. What is the scope? A region? A forest? The whole forest system? What about loss of resources or structures? For any of these alternatives, break points are needed. How are they established? Each one of these categories is affected by both the meteorological 'severity' of a season and management decisions, resource priorities, suppression tactics, and administrative policy. How does one normalize these over a century of fire suppression turned management? Because more acres burned one year than another, was it really a more severe year in terms of weather? Differences in suppression technologies from 1910 to 1967 are undoubtedly more significant than weather anomalies. In this study, the severity question was addressed by the too often used method of passing the buck. William C. Fischer some time ago selected some years he felt were 'severe' in different sections of the Northern Region (based on acres burned) and obtained weather data (on cards) for those years from the National Climatic Center. Those years are used in this study.

However a severe fire season is defined, comparison of potential burning conditions between years requires analysis of meteorological parameters independent of actual fire activity. Several meteorological data sets were employed and fire danger parameters from the 1978 National Fire Danger Rating System (Deeming, Burgan and Cohen, 1977) were computed to generate climatological profiles at several locations in Montana for selected severe fire years.

Data

Two data bases were used in this study. For the period 1 May to 31 October, the parameters:

- Observed Temperature (5 pm 1st)
- Maximum Daily Temperature
- Minimum Daily Temperature
- Observed Relative Humidity (5 pm 1st)
- Observed Wind Speed (5 pm 1st)
- 24 Hour Accumulated Precipitation

were used from the following airport locations and years and comprise the 'severe years' data base provide by Mr. Fischer.

LOCATION

| YEAR | Yellow- stone | Kali- spell | Helena | Miles City | Great Falls | Billings |
|-------|------------------|----------------|--------|---------------|----------------|----------|
| ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| 1910 | X | X | X | X | | |
| 1914 | X | X | X | X | | |
| 1917 | X | X | X | X | | |
| 1918 | | X | X | X | | |
| 1919 | X | X | X | X | | |
| 1920 | X | X | X | X | | |
| 1925 | X | X | X | X | | |
| 1926 | X | X | X | X | | |
| 1929 | X | X | X | X | | |
| 1931 | X | X | X | X | | |
| 1934 | X | X | X | X | | |
| 1960 | | | X | | X | X |
| 1961 | | | X | | X | X |
| 1967 | | X | X | | X | X |
| ----- | -- | -- | -- | -- | -- | -- |
| Total | 10 | 12 | 14 | 11 | 3 | 3 |

A second data base was constructed to approximate climatic 'normals' at the same locations using summary of the day, and hourly observation tapes from the National Climatic Center. These tapes were purchased in a previous cooperative aid agreement, which also developed the methodology to reconstruct fire weather observations from them. Records were constructed for a 5:00 pm LST observation from 1955 to 1977 inclusive, and compared to the 'severe years' profiles (except for the West Yellowstone station which closed in the 1940's). One other problem came about when I destroyed the 1955-1977 data tape for Kalispell after the precipitation and temperature analysis were completed but before wind, relative humidity, and NFDRS runs were completed. One other discrepancy is at the severe data set for Miles City. The cards for 1931 and 34 were missing but the data were in listings provided by Fischer. Some of the graphs in appendix C do not reflect averages that include 1931 and 34,

while others in the text do.

Both data sets were formatted for compatibility with FIRDAT (Main et. al, 1982) which was used to compute fire danger rating parameters. The parameters:

- Energy Release Component (ERC)
- Spread Component (SC)
- Burning Index (BI)
- 1000 Hour Fuel Moisture (FM1000)

were extracted from FIRDAT's 'FILE9' and summarized by 10-day and monthly periods. Fire danger indices for NFDRS fuel models G, C, and H were computed using a slope class of three (45 percent), but only the ERC for model G, and FM1000 are presented in the text. Seasonal graphs by year for the four stations of ERC, BI, and SC (G/3) are contained in appendices A, B, C, and D. The same graphs for the other models are also available should you be inclined to want to see them following the incredible results presented here. The ERC is a slowly responding index that most closely represents the former Build-up Index. The BI and SC are faster responding indices with larger daily fluctuations than the ERC. The (G/3) model/slope combination is commonly used in western mountainous terrain.

The FM1000, a dead fuel moisture analog, is designed to simulate moisture response in larger, dead fuels (3+ inches diameter) with timelags between 200 and 2000 hours. One thousand hours is the midpoint. It is based on seven-day boundary condition. The daily components of the boundary condition are precipitation amounts and duration, and daily temperature and relative humidity extremes. Day length is used to weight the influence of the extremes. (Maximum relative humidity and minimum temperature are assumed to occur simultaneously at night; minimum relative humidity and maximum temperature during the day. Longer days are influenced more by the day conditions, shorter days by the night conditions). Once a local climatology has been developed, FM1000 values can be used to monitor short-term (4 to 6 month) drought events. For example, seasonal minimum FM1000 hour values during the 1965 to 1975 period at Ninemile Ranger Station reached nine percent only 2 percent of the years (1965 and 1967) and mostly had seasonal minimums of 12 or 13 percent.

Additionally, published yearly climatic summaries at each station were compared to recently published 1951 to 1980 normals to compute severe year to normal accumulated precipitation ratios. These ratios were computed by month from January to October.

Analysis

Previously developed climatology programs SUMMARY, PRECIP1, and PRECIP2 were used to summarize:

- maximum daily temperature
- relative humidity
- FM1000
- ERC, BI, SC
- precipitation
- wind speed

by 10-day and monthly periods through the fire season for each of the severe years individually and grouped.

Seasonal trends, extreme values with comparisons to normal years are discussed for each station and there are numerous figures consolidating the information from the tables. Most of the figures show a season from 11 May to 10 September because of a 12 division limitation on the microcomputer graphics package used.

Except for precipitation ratios, data from Billings and Great Falls were not used in this analysis because of the lack of data (three years). When computing accumulated precipitation ratios, data from all 14 years were used at all five stations (except for Yellowstone which has no comparable normals).

Applicability

Because of the use of airport data prior to the advent of the fire danger weather station network, applicability of the information presented is quite limited. It is mainly informational with low spacial resolution and should not be considered representative of forested areas. A further complication is that the stations were moved several times over the years with effects that may or may not be significant. For example, at Miles City, the 1955-77 wind averages were about 5 miles per hour greater than the 1910-34 averages. I suspect a change in station location contributes more to that than an actual climatic change. A similar pattern was observed at Helena, where Arnold Finklin found wind recording equipment location was changed at least seven times since 1910 with downtown locations till sometime in the 1940's (anemometer heights ranged from 30 to 120 feet). Correlation between recent airport data and fire weather stations were not attempted because of the magnitude of the effort and slight chance of meaningful success.

The following sections are fire weather climatic summaries for the Helena, Kalispell, Mile City, and West Yellowstone, respectively.

This section describes climatic parameters at the Helena station for the fourteen selected years between 1910 and 1967. By 10-day and monthly periods, three meteorological and four fire danger rating parameters are discussed for the fire season from May till October. Comparisons are made for some variables to the most recent 1951-80 normals (NOAA 1982), and for others to the 1955-77 database created for this analysis.

PRECIPITATION

While there is always a precipitation deficient during severe fire years, the quantity and timing varies from season to season and from station to station. Table 1 summarizes precipitation during the 14 severe fire years at Helena. May and June are typically the wettest months of the fire season, each averaging just over 1.5 inches. September follows averaging 1.4 inches, October is next with just under an inch. The driest months are July and August with .85 and .62 inches, respectively.

For the 1951-80 period normals, May and June are the wettest months (1.72 and 2.01 inches), followed by August and July with 1.18, and 1.04 inches, respectively. For normal periods, October is the driest month (0.68) and September coming next with 0.83 inches. For the 1955-77 period the same order is present but the quantities differ slightly.

Another precipitation statistic of interest is the accumulated precipitation from the beginning of the year (for severe years) compared to the 1951-80 normal accumulated precipitation (fig 1). Note that during the 14 severe fire years, accumulated precipitation from January to May was slightly above normal. It then reaches it's maximum deficit in August. Shown as a ratio (fig. 2), Helena (solid line) begins around 100 percent of normal, decreases to a minimum value of 89 percent of normal and then recovers to a January through October accumulated ratio of about 97 percent of normal. The starting ratio of this curve differs greatly from the ratios of four other stations, but the shape of the curve is about the same.

Maximum Daily Temperature

Summary statistics of maximum daily temperature for the 14 selected years from 1910-67 are shown in table 2. Figure 3 traces the severe year maximums and normal maximums by 10-day period from the 11th of May to the 10th of September. There is a twenty day period in May-June when the maximum temperatures stay just below normal, then an extended period from 11 June to 21 July when they rise above normal, followed by 21 July to 11 August period of below normal temperatures. These deviations from normal are shown in Figure 4. The maximum deviation above normal is 2.7 degrees for the period beginning 21 June and the maximum deviation below normal is 4 degrees beginning 1 September. Both values are within the observed standard

deviation of those normal periods (about 6 degrees). Note the 21 July to mid August period of below normal temperatures, with a maximum deviation of only 1.8 degrees. This pattern of late July, early August maximum temperature drop is also observed at other stations.

For the severe years, July is the warmest month (84.7 degrees), followed by August at 81.4 degrees (1.2 degrees above and 0.4 degrees below normal, respectively). The warmest 10-day average was 95.1 for the ten days beginning August 11th in 1967, the year that also recorded the hottest August and September (89.7 and 78.7, respectively). The severe year of 1918 recorded the lowest July and August maximum temperatures, with respective values of only 78.4 and 75.5 degrees.

RELATIVE HUMIDITY

The mean observed relative humidity at five o'clock local standard time at Helena for the 14 severe years from 1910 to 1967, for 10-day periods from 11 May to 1 September is plotted as the dashed line in figure 5. Also plotted is the maximum (solid) and minimum (dotted) 10-day mean relative humidity for each 10-day period and the year of its occurrence. The average severe year begins with a 10-day average relative humidity of about 40 percent and dries to a July-August value of about 30 percent. The driest years start out at 28 percent (1919) and reach peak season minimums of about 16 percent on for a 10-day average (1960 and 1967). Minimum daily values regularly reach single digits during the period from 11 June to 1 September. Maximum period values begin above 50 percent and remain above 40 percent for the entire fire season. Relative humidity values are normally distributed with median values within 1 percent of the mean, and a standard deviation of about 5 percent. Table 3 summarizes observation time relative humidity from May to October for the 14 selected years from 1910 to 1967 at Helena.

NFDRS 1000 HOUR FUEL MOISTURE

Figure 6 displays the average seasonal trace of the 10-day average 1000 hour fuel moisture, the maximum and minimum average for each 10-day period, and the year of its occurrence. Traces are shown from 11 May to 1 September. Mean values begin about 20 percent and drop quickly to 16 percent where they stay during early June, the period normally with the most precipitation. Values then drop steadily to minimum values between 10 and 11 percent during the month of August. Moisture recovery then begins the first of September. The driest of the severe years curve (comprised mostly of 1919 values) is different. A steady decrease is noted from 11 May with minimum values of 7 to 9 percent occurring from the 11th of July through the first of September, when moisture recovery begins. For the four final 10-day periods (fig. 6) the 1919 values were less than one percent more than the plotted values for 1917 and 1929, making 1919 the driest year of the 14 selected severe fire years at

Helena, Montana.

By contrast, the wet years curve starts out at 23 percent, remains above 20 percent until 1 July, then drops sharply to about 16 percent and reaches seasonal minimum values of about 13 percent, 3 percent above the average severe year minimum and 6 percent above the dry year minimum. Unlike the dry years curve, a variety of years comprise this curve, although 1918 dominates 21 July to 21 August period. Table 4 summarizes the seasonal averages of the FM1000 at Helena for the 14 selected severe years.

1978 NFDRS FIRE DANGER RATING PARAMETERS

Using the G fuel model (dense conifer with heavy dead and down accumulation) and a slope class of 3 (approximately 50 percent), three indices were computed and averaged by 10-day periods -- ERC, SC, and BI. The SC is highly sensitive to the condition of fine fuels and wind speed. The ERC is sensitive to the same parameters, but tempered by the 1000 hour fuel moisture. The BI is a nonlinear function of the ERC and SC. The ERC most closely resembles the Build-up Index (BUI) used in many past fire danger analysis but is not directly comparable.

Appendix A contains yearly seasonal plots of the 10-day average of these parameters from May through October for the 14 selected severe fire years using Helena weather, plus the 14 year average seasonal trace. Table 5 summarizes 10-day average ERC values for the 14 selected years at Helena.

Figure 7 shows the seasonal traces of the 1910-1967 ERC, the 1955-77 average 10-day ERC, plus the traces of the single years 1919, 1934, and 1967. Note how the 1919 curve stands above the others with ERC increasing steadily with only one "respite" when average values dropped to near the maximum values experienced in 1934 and 1967. Maximum values for 1919 were nearly 20 points above the 1955-77 normal maximums and 15 above the 1910-67 database maximum.

The average severe year curve begins below the 1955-77 normals, crosses the curve in the first ten day period of June and remains about five points above the 1955-77 normal until the 11th of August when the 1955-77 normal value begins to decrease. The severe year curve does not begin its decline until the last 10 day period in August. Table 5a summarizes 10-day and monthly ERC values for 1955-77 showing 1973 (from a fire danger rating standpoint) one of the more severe years experienced. Only the 1929 August average of 77.6 was greater than the monthly averages for 1973, and that difference was only 4.6 -- insignificant considering the gross nature of the fire danger rating parameters.

Wind Speed

The 5 p.m. wind at helena for the severe year group and the 1955-77 period is graphed in figure 8. The more recent normals are greater than the severe years by about 1 to 2 miles per hour throughout the season. High and low daily values were about the same between the two data sets, but the highest monthly averages (for 1910-67) were all 1960 or 61 -- none from the earlier years (see tables 6 and 6a). This probably reflects a change in station location which also may account for the slightly higher 1955-77 monthly and 10-day period averages.

This section describes several climatic parameters at the Kalispell station for the twelve selected years between 1910 and 1967. Comparison of ERC, FM1000, and wind speed to the 1955-77 normals is not made because of the aforementioned tape file destruction.

PRECIPITATION

Table 7 summarizes precipitation during the 12 severe fire years at Kalispell. May and June are typically the wettest months of the fire season, averaging just over 1.0 and 1.66 inches respectively. September follows averaging 1.26 inches, October is next with just over 1.2 inches. The driest months are July and August with .54 and .72 inches, respectively.

For the 1951-80 period normals, May and June are also the wettest months (1.77 and 2.01 inches), followed by August (1.64), September (1.09), and October (1.05). July is the driest month with 1.01 inches. For the 1955-77 period the same order is present but the quantities differ slightly.

Accumulated precipitation from the beginning of the year (for severe years) is compared to the 1951-80 normal accumulated precipitation in figure 9. During the 12 severe fire years, accumulated precipitation from January through April was slightly below normal and reached its maximum deficit in August. Shown as a ratio (fig. 8), Kalispell (dotted line) began around 77 percent of normal, decreased 4 percent to a 73 minimum value, and recovered to a January through October value of about 80 percent of normal.

Maximum Daily Temperature

Summary statistics of maximum daily temperature for the 12 selected years at Kalispell from 1910-67 are shown in table 8. Figure 11 traces the severe year maximums and normal maximums by 10-day period from the 11th of May to the 10th of September. There was a twenty day period in May-June when the maximum temperatures stayed just below normal, then an extended period from 11 June to 21 July when they rose above normal, followed by 21 July to 21 August period of below normal temperatures. As deviations from normal, shown in Figure 12, the maximum above normal was 2.4 degrees for the period beginning the first of July, and the maximum below normal was 2.8 degrees beginning August first. Both values were within the observed standard deviation of those normal periods (about 6 degrees).

For the severe years, July was the warmest month (83.2 degrees), followed by August at a "cool" 79.5 degrees (1.2 degrees above and 1.1 degrees below normal, respectively). The warmest 10-day average was 95.2 for the ten days beginning August 11th in 1967, the year that also recorded the hottest July, August and September (86.1, 89.4 and 79.2, respectively). The year 1918 recorded the lowest July and August average maximum

temperatures (78.5 and 72.3 degrees).

The year 1967 recorded the highest 10-day average maximum temperatures from July 11th to October 1st, interrupted only by a 1918 maximum of 75 degrees for the 11th to 20th of September when 1967 experienced 74 degrees -- still seven degrees above normal! August and September of 1967 were the warmest recored in the 1955-77 sample. The warmest June and July were 1961 and 1960 respectively, but these years were not in the severe database for Kalispell.

RELATIVE HUMDITY

The mean observed relative humidity at five o'clock local standard time at Kalispell for the 12 severe years from 1910 to 1967, for 10-day periods from 11 May to 1 September is plotted as the dashed line in figure 13. Also plotted are maximum (solid) and minimum (dotted) 10-day mean relative humidity for each 10-day period and the year of its occurrence. The average severe year begins with a 10-day average relative humidity of about 40 percent and dries to a July-August value of about 27 percent. The driest years start out at 31 percent (1929) and reach peak season minimums of about 17 percent on for a 10-day average (1929 and 1967). Minimum daily values occasionally reached single digits during the period from 11 June to 1 September.

The minimum average curve is comprised mostly of the years 1919, 1929, 1934, and 1967 -- four of the most severe fire years in the northwestern Montana.

Maximum period values begin above 50 percent and remain above 40 percent for the entire fire season. Relative humidity values are normally distributed with median values within 1 percent of the mean, and a standard deviation of about 5 percent. Table 9 summarizes observation time relative humidity from May to October for the 12 selected years from 1910 to 1967 at Kalispell. Noted values of one percent in the table are questionable. Reference to the original data find extremely low dry bulb temperatures, indicating either poor observations, or problems of another sort. Kalispell was the only station to have this problem, and, save the one observation in 1917, they all occurred in September of 1920.

NFDRS 1000 HOUR FUEL MOISTURE

Figure 14 displays the average seasonal trace of the 10-day average 1000 hour fuel moisture, the maximum and minimum average for each 10-day period, and the year of its occurrence. Traces are shown from 11 May to 1 September. Mean values began about 19 percent and dropped quickly to 16 percent where they held during early June, the period normally experiencing maximum precipitation. Values then dropped steadily to minimum values between 11 and 13 percent during late July through August with moisture recovery beginning the first of September. The driest

of the severe years curve (comprised mostly of 1919 and 1934 values) shows a similar shape. A steady decrease is noted from 11 May to 11 June with a ten day pause. Minimum values of about 8 percent occurred the last of August in 1934. Moisture recovery began again in September.

By contrast, the wet years curve starts out at 20 percent, remains above 18 percent until mid July, then drops sharply to a minimum values of about 15 percent, 3 percent above the average severe year minimum and 7 percent above the dry year minimum. Like the dry years curve, a variety of years comprise this curve, although, as with the Helena curve, 1918 dominates the 21 July to 21 August period for having the highest 1000 hour fuel moisture.

I found it interesting that although 1967 had the hottest July, August, and September, and also the driest July, August, and September (see tables 7 and 8), 1919 and 1934 dominated the FM1000 minimums. The minimum FM1000 10-day average in 1967 was 11 percent. In 1919 it was nine percent and eight percent in 1934, both of which had lower FM1000 values in May and June than did 1967. Why? Probably relative humidity during the spring. In 1934, the average relative humidity was lower than May and June of 1967 by a 4 to 24 percent. May and June of 1967 had the highest 5 p.m. relative humidities in the sample. This relative humidity is used to estimate a days maximum and minimum relative humidity, which are critical in the calculating FM1000 values. A perusal of the calculated maximum relative humidities in 1934 and 1967 proves interesting. For July, humidity recovery exceeded 90 percent 71 percent of the days in 1967 and only 13 percent of the days in 1934. For August, it was 29 and 7 percent respectively.

This raises several questions. First of course is the accuracy of the NFDRS humidity recovery estimate. Is the reflection of prolonged humidity recovery accurate in its expression through higher 1000 hour fuel moisture values? Probably so. The bigger question is whether a change in station location between 1934 and 1967 is responsible, or is this an accurate depiction of a climatic anomaly? Even if it is, remember that the location was in a valley station and it's experience of humidity recovery would not be duplicated at higher locations.

1978 NFDRS FIRE DANGER RATING PARAMETERS

Appendix B contains yearly seasonal traces of ERC, BI, and SC (G/3) for the 12 selected severe fire years, and the 12 year average using Kalispell 5 p.m. weather. Table 11 summarizes 10-day average ERC values for the 12 selected years at Kalispell.

July and August exhibit maximum ERC values with mid season values nearly double those in May and October. Maximum daily values were in the low eighties and minimum daily values near 20 in July and August. Since the ERC reflects the condition of the larger fuels, it follows that minimum 1000 hour value periods

will usually reflect maximum ERC values. This was true for the months of June, July, August, and September. A maximum 10-day average ERC of 74.7 occurred in mid August in 1934, the period and year also displaying the lowest 1000 fuel moisture average. Note 1967 which had three lowest average entries before July first and the lowest June ERC average of the 12 years.

Wind Speed

Wind analysis at Kalispell is fairly uneventful, with May, June, and July averaging about 8 mile per hour at 5 p.m. and maximum daily values mostly in the 20's. Table 12 summarizes the wind at Kalispell for the 12 selected severe years.

This section describes the climatic parameters at the Miles City station for the 12 selected years between 1910 and 1934. Comparisons are made for some parameters to the recently published 1951-80 normals, and for others to the 1955-77 database created for this analysis.

PRECIPITATION

For the 1951-80 May to October normals, May and June are the wettest months, (2.31 and 2.75 inches respectively), followed by July and August with 1.52, and 1.26 inches, respectively. October is the driest month (0.90) and September next with 1.08 inches. For the 1955-77 period the same order is present but the quantities differ slightly. The 12 severe year fire season precipitation summary is tabulated in table 13. Precipitation is less than normal throughout the six months from May to October, with greatest deficits in May, June, and July.

Accumulated precipitation from the beginning of the year (for severe years) compared to the 1951-80 normal accumulated precipitation is shown in figure 15. During the 12 severe fire years, accumulated precipitation from January through April was just slightly below normal. The deficit increased monthly to an August maximum. As a ratio (fig. 16), Miles City (long dashed) began around 78 percent of normal in May, decreased to a minimum value of 69 percent of normal in August, and recovered to a January through October ratio of about 76 percent of normal. This curve closely follows the ratio curve at Kalispell, and is based on the same 14 years and 1951-80 normals.

Maximum Daily Temperature

Summary statistics of maximum daily temperature for the 12 selected years from 1910-34 are shown in table 14. Figure 17 traces the severe year and normal maximums by 10-day period from the 11th of May to the 10th of September. Severe year temperatures averaged several degrees above normal until dropping to several degrees below normal for the first 10-day period in June. They then remain above normal until the first part of August, when they remain near or below normal through the end of the season.

Shown as deviations from normal (fig. 18), the maximum above normal was 2.9 degrees for the period beginning 10 June and the maximum below normal was 3.6 degrees beginning 1 September. Both values are within the observed standard deviation of those normal periods (about 6 degrees). Note again late July to mid August period of below normal temperatures-- the pattern also observed at other stations.

For the severe years, July was the warmest month with a severe year maximum daily temperature average of 89.9 degree

(only one degree above the 1951-80 normal), followed by August (86.0) and June (81.1). These compare to normal values of 86.6 for August and 79.2 for June. The warmest 10-day average was 99.1 for the ten days beginning June 21st in 1919 which also recorded the warmest June (88.2 degrees). The warmest month was July of 1914 when the daily maximum temperature averaged 93.3 degrees, while the warmest August was reported in the severe year of 1929. The coolest severe year August was in 1926, the coolest June was in 1925, and the coolest July was 1918.

Individual daily maximum temperatures at Miles City regularly reach 100 degrees during June, July, and August and often will do so several days running.

RELATIVE HUMIDITY

The mean observed relative humidity at five o'clock local standard time at Miles City for the 12 severe years from 1910 to 1934, for 10-day periods from 11 May to 1 September is plotted as the dashed line in figure 19. Also plotted is the maximum (solid) and minimum (dotted) 10-day mean relative humidity for each 10-day period and the year of its occurrence. The average severe year began with a 10-day average relative humidity of about 41 percent and fell to mid-July minimum values of about 31 percent. The driest years started out at 20 percent (1934) and reached peak season minimums of 15 to 22 percent. Minimum daily values occasionally reach single digits during the entire fire season. Maximum period averages began above 50 percent and remained above 40 percent for the entire fire season. Table 15 summarizes observation time relative humidity from May to October for the 12 selected years from 1910 to 1934 at Miles City.

NFDRS 1000 HOUR FUEL MOISTURE

Figure 20 displays the seasonal trace of the 10-day average FM1000, the maximum and minimum average for each 10-day period, and the year of its occurrence. Traces are shown from 11 May to 1 September. Mean values began about 14 percent and held at about 13 percent during early June, the period normally with the most precipitation. Values then dropped steadily to minimum values between 10 and 11 percent at the first of August. Moisture recovery began in mid-August. The driest of the severe years curve (comprised mostly of 1934 values) started at 11 percent and dropped to nine percent by the end of June and had July and August mean values of 8.3 percent. From a perspective of 1000 hour fuel moisture, 1934 was the driest of the 12 selected severe fire years at Miles City, Montana.

By contrast, the wet years curve starts out at 17 percent, remains above 16 percent until 21 July, then drops to seasonal minimum values of about 13 percent, about 2 percent above the average severe year minimum and 5 percent above the dry year minimum. Unlike the dry years curve, a variety of years comprise this curve, although 1920 dominates the 21 June to 1 August

Miles City

period with 1914, 1917, 1918, and 1919 comprising other period maximum averages. Table 16 summarizes the severe year FM1000 values for the 12 selected years. In comparison to the 1955-77 average values, FM1000 averaged about three percent lower, and 0.6 lower in August for the severe years data set.

Please note here that Miles City is in NFDRS climate zone one which gives the FM1000 an initial value of 15 percent. The other stations are in zone three and have initial values of 25 percent, hence the lower preseason value at Miles City. Figure 20a illustrates the FM1000 sequence at Miles City using an initial value of 25 percent (for 1910-1929, not 1934).

1978 NFDRS FIRE DANGER RATING PARAMETERS

Appendix C contains yearly seasonal traces for the ERC, BI, and SC for the years 1910 through 1929, and the 1910-29 average values. Table 17 summarizes 10-day average ERC values for the 12 selected years (1910-34) at Miles City.

Note that 1931 and 1934 dominated the 10-day and monthly record high values, with a July 1934 high of 75.2. This compares to record July highs of 72.4 at Helena (1919) and 69.5 at Kalispell (also 1919). Also note the relatively high beginning value of about 45 in May at Mile City verses starting values in the low 30's at Helena and Kalispell. This corresponds to the lower initial FM1000 values at Miles City.

Wind Speed

Like the other stations, the 10-day average wind speed declines at Miles City throughout the season. But as noted before, the 1955-77 average is about 5 mile per hour greater than the 1910-34 period-- a difference probably caused more by a station relocation than climate change, or indication of a severe year anomaly. Tables 18 and 18a and figure 21 summarize 5 p.m. wind speed at Miles City for 1910-34 and 1955-77 respectively. Arnold Finklin is currently trying to dig up some station history for Miles City to document station history.

This section describes some climatic parameters at the Yellowstone station for the ten selected years between 1910 and 1934. Because the station closed down in the 1940's, no comparisons to recent normals are made.

PRECIPITATION

Table 19 summarizes precipitation during the ten severe fire years at Yellowstone. Like the other stations, May and June are typically the wetter months of the fire season. May averaged 1.78 inches with ranges from 2.84 in 1920 to 0.42 in 1934. June averaged 1.54 and also had the highest standard deviation (1.13 inches) with yearly ranges from 3.48 in 1934 to 0.14 in 1919. One and five hundredths of the 1934 total of 3.48 inches came on one day. The driest months were July and August with .85 and .62 inches, respectively.

Maximum Daily Temperature

Summary statistics of maximum daily temperature for the ten selected years from 1910-34 are shown in table 20.

For the severe years, July was the warmest month (78.4 degrees), followed by August at 75.3 degrees. The warmest 10-day average was 83 for the ten days beginning July 11th in 1925. The severe year of 1917 recorded the lowest May and August maximum temperatures, with respective values of 52.9 and 71.2 degrees, while 1914 recorded the minimum July value (77 deg.) and 1926 the lowest June average maximum temperature with 46 degrees. June and July of 1919 recorded the highest monthly averages -- 75.2 and 81 degrees, respectively.

RELATIVE HUMIDITY

The mean observed relative humidity at five o'clock local standard time at Yellowstone for the ten severe years from 1910 to 1934, for 10-day periods from 11 May to 1 September is plotted as the dashed line in figure 22. Also plotted is the maximum (solid) and minimum (dotted) 10-day mean relative humidity for each 10-day period and the year of its occurrence. The average severe year began with a 10-day average relative humidity of about 40 percent and fell to a July-August value of about 30 percent. The driest years started out at 26 percent (1934) and reached peak season minimums of about 14 percent in the last period of June of 1919, although average minimums of 19 percent were more consistently observed. Minimum daily values rarely reached single digits at the Yellowstone station. Maximum period values began above 50 percent and remained above 40 percent for the entire fire season. Relative humidity values are normally distributed with median values within 1 percent of the mean, and a standard deviation of about 10 percent. Table 21 summarizes observation time relative humidity from May to October for the ten selected years from 1910 to 1934 at Yellowstone.

NFDRS 1000 HOUR FUEL MOISTURE

Figure 23 displays the seasonal trace of the 10-day average FM1000, the maximum and minimum average for each 10-day period, and the year of its occurrence. Traces are shown from 11 May to 1 September. Mean values began about 21 percent and drop steadily to 13 percent minimum values in July and August. Moisture recovery then began the first of September. The driest of the severe years curve (comprised mostly of 1919, 31 and 34 values) is similar to the average curve but begins at 18 percent and reached seasonal minimum values of about nine percent.

By contrast, the wet years curve starts out at 23 percent, remains above 19 percent until 1 July, then drops sharply to a seasonal minimum value of about 15 percent. The wet years curve is dominated by 1925 values except for the second periods of May which were taken by 1910.

1978 NFDRS FIRE DANGER RATING PARAMETERS

Appendix D contains yearly seasonal plots of the 10-day average ERC, BI, and SC (G/3). Table 23 summarizes the 10-day average ERC values for the ten selected years at West Yellowstone.

The severe season average at Yellowstone reached a maximum of about 52 (about 6 less than Helena) for July and August after after a May beginning value of about 28. Most maximum daily values occurred in 1919, 1931, and 1934, with 82 the highest daily value recorded -- in July of 1919. Minimum 10-day averages were mostly recorded in 1925 and 1926.

Wind Speed

Table 24 summarizes 5 p.m. wind at Yellowstone for the 1910-34 severe year group and shows an average wind speed of about nine miles per hour throughout the season. The table shows the basic declining trend also noted at the other stations.

Billings and Great Falls

For strictly informational purposes, accumulated precipitation and the deficit ratio were computed for Great Falls and Helena for the 14 years in the Helena group in comparison to the 1951-80 normals. Great Falls is shown in figures 24 and 25; Billings in figures 26 and 27. Billings showed a constantly decreasing deficit (increasing ratio) after in January though April ratio of 0.64. Great Falls began near the value of Kalispell and Miles City, and except for a lull in July, also saw a constantly increasing ratio throughout the fire season. These curves are markedly different than the other three and may reflect why only 1960, 1961, and 1967 were included in the sample selected by Bill Fischer.

Comparison of Severe Years to Normal

Figure 28 illustrates a typical comparison of normal vs severe years maximum temperature, and ERC at Helena. Temperature differences are small, but the trend was repeated at each station where comparisons were possible -- a preseason warmer than normal by a few degrees, followed by late July to mid August period of slightly below normal maximum daily temperatures. The difference in potential burning conditions, integrated via the ERC, are more apparent. Normal years began with higher ERC values than the severe years. The traces crossed in late June where the severe years ERC steadily climbed above normal values. Severe years also tend to begin their decline a few weeks later than the normal years data group. Severe years also saw steadily increasing precipitation deficits, with August minimum ratios ranging from 90 percent of normal at Helena to 69 percent at Miles City

Between Stations and Years

Figures 29 a, b, c, and d trace the severe year averages of BI, ERC, and SC at Kalispell, Helena, Yellowstone and Miles City. The Miles City figure (d) is for 1910-29 and was made using the same FM1000 starting value as the other stations. The 1910-34 ERC trace with the lower FM1000 starting value falls very close to the BI curve in figure 29d.

All stations exhibit similar profiles, with Helena and Miles City demonstrating the highest July/August values. Only Yellowstone did not reflect a several week break in the ERC increase for the mid May to mid June period. Spread components generally show decreasing averages, probably reflecting the previously noted wind speed patterns.

The seasonal traces of FM1000 at the stations for 1918, 1919, and 1929 are shown in figures 30 a,b, and c. They show considerable diversity between years and stations, particularly in 1929, one of least severe of the severe year groups.

Figures 31 a,b,c,d, and 32 a,b,c, and d illustrate seasonal NFDRS parameters at Helena and Kalispell for the three severe years (1910, 1934, and 1967) and the not so severe year, 1918). Again considerable diversity is noted between both stations and years, but generally more difference is seen between years than stations. Figures 33 a,b,c,d illustrate the same concept at Yellowstone, except for the severe years of 1910, 1914, and 1934, and the less severe year, 1920.

Finally, figures 33 a,b,c, and d combine the average severe year trace of ERC, maximum daily temperature, FM1000, relative humidity, and the ratio of accumulated precipitation to normal for Helena, Kalispell, Miles City, and Yellowstone, respectively. (Yellowstone has no ratio). The integrating NFDRS parameters

shows a continuous build up beginning in late June, and continues until mid to late August. The ERC trace lags maximum temperatures maximums by one to two weeks, but almost mirrors the 5 p.m. relative humidity average values.

Severe years tend to have lower than normal May ERC values, and the ERC seems to be the most responsive indicator of seasonal severity. The FM1000 appears to be a good indicator of short term drought, with differences of only two to five percent being quite significant.

In conclusion, I make the following points.

1. There is high variability in climatic and fire danger rating parameters from one severe year to another, and less variability from station to station for the same year.
2. Severe years were marked by increasing precipitation deficits from January through August, but wetter than normal Septembers and Octobers.
3. June and July of severe years were slightly warmer than normal, but August in severe years was slightly cooler than normal.
4. Severe years had lower ERC values in May and early June than normal years, and July seems to be a critical month in setting the stage for the severity of a fire season.
5. 10-day average FM1000 values below ten percent are associated with all the severest of the severe years, with seven percent being the lowest daily value computed for all stations and years.
6. The NFDRS indices are more useful in tracking the severity of a season than climatic parameters alone.
7. The NFDRS ERC is more dynamic in seasonal variation as an indicator of potential season severity than climatic parameters, but unlike the FM1000 is linked to a fuel model. ERC profiles for other fuel model/slope class combinations are different from those presented here. The FM1000 profile however is constant throughout a climate zone making for a more common denominator.
8. From a climatic and fire danger perspective, five years generally stand out as the most severe of the severe years in Montana since 1910. They are 1910, 1919, 1929, 1934, and 1967. Other less severe years were 1914, 1931, 1960, and 1961, while 1917, 1918, 1920, 1925, and 1926 were the least severe of the severe years. The year 1973 experienced very serious potential burning conditions with low FM1000 and some recored high ERC values (table 5a), but the third leg of the fire triangle was missing - ignitions.

Which brings us to the final conclusion. You can't really tell where your going in a fire season; you can use climatology to tell where you are in a current season; but nothing is going to put the question of lightning and wind storms in the Northern Rocky mountains *to rest.*

Literature Cited

- Deeming, John E., R. Burgan, and J Cohen.
1977. The 1978 National Fire Danger Rating System. USDA
Forest Service, Intermountain Forest and Range Exp. Stn.
INT-39, Ogden, UT.
- Main, William, and others.
1982. A User's Guide to FIREFAMILY: A computer program for
fire planning with historic weather data. GTR NC-73.
Northcentral Forest Experiment Station, St. Paul, Minn.
- NOAA - Climatology of the United States.
1982. Monthly normals of temperature, precipitation, and
heating and cooling degree days 1951-80: Montana. US
Dept. of Commerce, National Oceanic and Atmospheric
Administration, Environmental Data and Information
Service, National Climatic Center, Asheville, NC.

Tables 1 - 24

PRECIPITATION

BY 10 (OR 11)-DAY AND MONTHLY PERIODS

STATION NUMBER 24455 — HELENA AIRPORT

YRS 1911-1967

| PERIOD | | NO. YRS | MEAN TOTAL | 10-DAY AND MONTHLY TOTALS | | | MAXIMUM DAILY TOTALS | | | | | |
|--------|-----|------------|---------------|---------------------------|---------|--------------------|----------------------|--------------|---------|------------|------------|--------|
| BEGINN | END | | | STD DEV | MEDIAN | HIGHEST TOT, YR | LOWEST TOT, YR | T EXTREME | YR | AVE DAY | STD DEV | MEDIAN |
| MAY | 1 | 14 | 0.693 | 0.610 | 0.455 | 1.92 26 | 0.15 31 | T | 1.45 14 | 0.441 | 0.417 | 0.305 |
| MAY | 11 | 14 | 0.375 | 0.306 | 0.260 | 1.22 20 | 0.03 67 | T | 1.02 20 | 0.272 | 0.279 | 0.190 |
| MAY | 21 | 13 | 0.695 | 0.621 | 0.460 | 2.44 17 | 0.00 34 | T | 0.70 17 | 0.326 | 0.226 | 0.310 |
| JUN | 1 | 14 | 0.698 | 0.800 | 0.340 | 2.39 34 | 0.00 60 | T | 0.87 34 | 0.309 | 0.338 | 0.160 |
| JUN | 11 | 12 | 0.624 | 0.590 | 0.330 | 1.85 26 | 0.08 34 | T | 1.15 14 | 0.326 | 0.297 | 0.285 |
| JUN | 21 | 13 | 0.418 | 0.328 | 0.360 | 1.14 31 | 0.00 26 | T | 0.78 14 | 0.227 | 0.234 | 0.180 |
| JUL | 1 | 14 | 0.376 | 0.399 | 0.265 | 1.56 26 | 0.00 34 | T | 1.11 26 | 0.249 | 0.276 | 0.230 |
| JUL | 11 | 14 | 0.287 | 0.161 | 0.095 | 2.22 18 | 0.00 26 | T | 0.90 18 | 0.153 | 0.244 | 0.055 |
| JUL | 21 | 14 | 0.182 | 0.224 | 0.070 | 0.65 18 | 0.00 27 | T | 0.46 31 | 0.132 | 0.165 | 0.045 |
| AUG | 1 | 13 | 0.202 | 0.175 | 0.140 | 0.62 60 | 0.02 34 | T | 0.35 20 | 0.138 | 0.114 | 0.080 |
| AUG | 11 | 14 | 0.193 | 0.286 | 0.055 | 1.00 60 | 0.00 20 | T | 0.67 60 | 0.134 | 0.190 | 0.055 |
| AUG | 21 | 14 | 0.241 | 0.306 | 0.195 | 0.99 10 | 0.00 19 | T | 0.91 10 | 0.183 | 0.272 | 0.090 |
| SEP | 1 | 14 | 0.331 | 0.428 | 0.135 | 1.50 26 | 0.00 17 | T | 0.80 26 | 0.186 | 0.223 | 0.085 |
| SEP | 11 | 13 | 0.444 | 0.422 | 0.370 | 1.42 14 | 0.00 19 | T | 0.96 25 | 0.272 | 0.288 | 0.230 |
| SEP | 21 | 14 | 0.571 | 0.457 | 0.545 | 1.42 20 | 0.00 60 | T | 1.20 20 | 0.319 | 0.309 | 0.270 |
| OCT | 1 | 14 | 0.355 | 0.589 | 0.090 | 2.01 14 | 0.00 61 | T | 0.84 14 | 0.190 | 0.274 | 0.060 |
| OCT | 11 | 14 | 0.282 | 0.407 | 0.090 | 1.29 20 | 0.00 31 | T | 1.16 20 | 0.201 | 0.313 | 0.080 |
| OCT | 21 | 14 | 0.324 | 0.358 | 0.175 | 1.23 25 | 0.00 26 | T | 0.44 25 | 0.169 | 0.144 | 0.135 |
| MONTH | | | | | | | | | | | | |
| MAY | 12 | 1.686 | 0.766 | 1.395 | 3.34 17 | 0.88 29 | T | 1.45 14 | 0.613 | 0.386 | 0.495 | |
| JUN | 12 | 1.662 | 1.001 | 1.755 | 3.63 14 | 0.25 60 | T | 1.15 14 | 0.527 | 0.300 | 0.445 | |
| JUL | 14 | 0.846 | 0.806 | 0.670 | 3.18 18 | 0.16 19 | T | 1.11 26 | 0.343 | 0.304 | 0.260 | |
| AUG | 13 | 0.616 | 0.605 | 0.580 | 2.12 60 | 0.03 34 | T | 0.91 10 | 0.282 | 0.287 | 0.160 | |
| SEP | 13 | 1.355 | 0.849 | 1.440 | 3.03 25 | 0.13 60 | T | 1.20 20 | 0.488 | 0.341 | 0.370 | |
| OCT | 14 | 0.961 | 0.861 | 0.790 | 2.78 25 | 0.06 26 | T | 1.16 20 | 0.361 | 0.329 | 0.275 | |

Table 1: Precipitation Summary Table for Helena, 1910-1967
Selected Years

Appendix A

A-1

MAXIMUM DAILY TEMPERATURE

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 244855

HELENA AIRPORT

1910-1967

10-DAY AND MONTHLY PERIOD MEANS

10-DAY AND MONTHLY EXTREMES

| PRD. BEGINS | MEAN | STD. DEV. | MEDIAN | HIGHEST AVG, YR | LOWEST AVG, YR | HIGH, YR | AVG. HIGH | STD. DEV. | MEDIAN HIGH | LOW, YR | AVG. LOW | STD. DEV. | MEDIAN LOW | PRD. BEGINS |
|----------------|------|--------------|--------|--------------------|-------------------|----------|--------------|--------------|----------------|---------|-------------|--------------|---------------|----------------|
| MAY 1 | 59.6 | 4.9 | 58.5 | 69.1 34 | 52.3 19 | 82 62 | 74.3 | 6.2 | 75.0 | 37 18 | 45.1 | 6.6 | 45.5 | MAY 1 |
| MAY 11 | 65.5 | 3.6 | 65.5 | 70.9 25 | 59.1 18 | 88 62 | 79.5 | 5.2 | 80.5 | 40 10 | 48.2 | 5.0 | 48.5 | MAY 11 |
| MAY 21 | 68.7 | 7.5 | 69.0 | 78.8 34 | 53.8 17 | 95 19 | 80.8 | 7.8 | 82.0 | 40 18 | 52.4 | 7.5 | 53.5 | MAY 21 |
| JUN 1 | 69.9 | 6.6 | 68.5 | 80.4 26 | 58.8 25 | 94 18 | 82.6 | 6.7 | 82.5 | 48 25 | 56.9 | 8.3 | 54.5 | JUN 1 |
| JUN 11 | 74.1 | 6.7 | 72.0 | 87.8 18 | 60.4 26 | 96 61 | 86.7 | 6.6 | 87.0 | 47 17 | 59.4 | 8.9 | 58.0 | JUN 11 |
| JUN 21 | 78.5 | 5.6 | 77.5 | 88.8 19 | 68.0 14 | 98 19 | 89.5 | 6.3 | 90.5 | 55 14 | 65.9 | 6.2 | 67.0 | JUN 21 |
| JUL 1 | 81.7 | 3.6 | 82.0 | 86.5 61 | 75.7 10 | 97 19 | 90.1 | 3.5 | 89.5 | 57 29 | 69.7 | 6.9 | 69.0 | JUL 1 |
| JUL 11 | 86.1 | 3.3 | 86.0 | 91.9 60 | 79.3 18 | 102 62 | 94.0 | 3.9 | 93.0 | 63 20 | 75.0 | 6.0 | 75.0 | JUL 11 |
| JUL 21 | 86.1 | 4.2 | 87.0 | 91.7 60 | 74.4 18 | 102 31 | 94.9 | 4.0 | 94.5 | 46 18 | 73.7 | 10.2 | 75.0 | JUL 21 |
| AUG 1 | 82.7 | 4.4 | 82.0 | 90.0 61 | 74.5 26 | 103 61 | 91.6 | 3.9 | 91.0 | 56 26 | 71.5 | 7.4 | 73.0 | AUG 1 |
| AUG 11 | 82.4 | 6.5 | 82.5 | 95.1 67 | 72.3 26 | 99 29 | 92.1 | 4.6 | 93.0 | 56 25 | 71.1 | 10.9 | 69.0 | AUG 11 |
| AUG 21 | 79.3 | 5.5 | 78.5 | 88.3 29 | 70.2 10 | 98 67 | 90.1 | 4.3 | 90.5 | 51 10 | 64.9 | 9.8 | 64.0 | AUG 21 |
| SEP 1 | 70.9 | 7.3 | 72.0 | 87.1 67 | 57.4 10 | 99 67 | 83.4 | 6.8 | 83.0 | 45 10 | 57.4 | 8.8 | 56.5 | SEP 1 |
| SEP 11 | 68.5 | 5.6 | 68.0 | 76.1 60 | 56.7 26 | 94 61 | 80.9 | 7.0 | 80.5 | 37 25 | 52.2 | 8.6 | 55.0 | SEP 11 |
| SEP 21 | 61.0 | 9.1 | 61.0 | 79.2 67 | 48.6 34 | 90 67 | 77.5 | 8.4 | 80.0 | 23 34 | 44.5 | 12.6 | 43.5 | SEP 21 |
| OCT 1 | 61.3 | 7.7 | 62.0 | 70.8 17 | 44.5 14 | 84 60 | 74.6 | 6.4 | 74.0 | 25 19 | 46.3 | 10.2 | 49.0 | OCT 1 |
| OCT 11 | 57.6 | 7.0 | 57.0 | 66.1 61 | 43.5 25 | 79 61 | 69.0 | 7.3 | 69.5 | 32 25 | 46.2 | 8.3 | 46.0 | OCT 11 |
| OCT 21 | 49.5 | 8.1 | 51.5 | 58.3 60 | 30.8 19 | 80 10 | 63.9 | 8.1 | 65.0 | 11 25 | 35.4 | 12.0 | 38.0 | OCT 21 |
| MONTH | | | | | | | | | | | | | | MONTH |
| MAY | 64.7 | 3.8 | 64.5 | 73.1 34 | 59.0 18 | 95 19 | 84.1 | 4.8 | 84.0 | 37 18 | 42.7 | 3.7 | 42.5 | MAY |
| JUN | 74.1 | 4.5 | 72.5 | 83.6 61 | 68.8 14 | 98 19 | 91.3 | 4.5 | 92.0 | 47 17 | 53.1 | 4.1 | 52.5 | JUN |
| JUL | 84.7 | 2.6 | 84.0 | 88.8 60 | 78.4 18 | 102 60 | 96.9 | 3.1 | 96.0 | 46 18 | 66.9 | 8.4 | 67.5 | JUL |
| AUG | 81.4 | 4.5 | 80.5 | 89.7 67 | 75.5 18 | 103 61 | 94.5 | 3.5 | 94.0 | 51 10 | 62.3 | 9.0 | 58.0 | AUG |
| SEP | 66.8 | 5.5 | 67.0 | 78.7 67 | 56.3 26 | 99 67 | 86.4 | 5.8 | 87.0 | 23 34 | 41.9 | 9.7 | 43.0 | SEP |
| OCT | 56.1 | 5.6 | 58.5 | 60.8 60 | 43.2 25 | 84 60 | 76.0 | 6.0 | 77.0 | 11 25 | 33.7 | 10.7 | 36.5 | OCT |

Table 2: Maximum daily temperature summary table. Helena 1910-1967
Selected Years

RELATIVE HUMIDITY 5 P.M.

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 244055

HELENA AIRPORT

1910-1967

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | PRD. BEGINS |
|---------------------------------|------|--------------|--------|--------------------|-------------------|-----------------------------|--------------|--------------|----------------|---------|-------------|--------------|---------------|----------------|
| PRD. BEGINS | MEAN | STD. DEV. | MEDIAN | HIGHEST AVG, YR | LOWEST AVG, YR | HIGH, YR | AUG. HIGH | STD. DEV. | MEDIAN HIGH | LOW, YR | AUG. LOW | STD. DEV. | MEDIAN LOW | |
| MAY 1 | 41.6 | 6.3 | 42.5 | 59.1 26 | 30.7 10 | 100 26 | 77.1 | 13.2 | 76.0 | 10 10 | 15.4 | 6.1 | 17.0 | MAY 1 |
| MAY 11 | 37.5 | 6.4 | 38.0 | 49.7 29 | 26.8 19 | 93 20 | 72.9 | 10.5 | 72.0 | 7 19 | 17.9 | 6.4 | 17.5 | MAY 11 |
| MAY 21 | 37.4 | 11.7 | 33.0 | 70.3 17 | 24.9 34 | 93 17 | 72.7 | 12.5 | 73.5 | 6 08 | 18.1 | 7.2 | 16.5 | MAY 21 |
| JUN 1 | 39.5 | 14.6 | 33.5 | 61.3 67 | 28.6 26 | 94 34 | 67.4 | 23.8 | 79.0 | 11 18 | 21.9 | 8.2 | 20.5 | JUN 1 |
| JUN 11 | 37.6 | 8.8 | 36.0 | 55.2 26 | 23.4 61 | 94 29 | 69.1 | 15.4 | 70.5 | 6 61 | 18.9 | 6.4 | 17.5 | JUN 11 |
| JUN 21 | 33.4 | 7.9 | 33.5 | 48.5 14 | 17.4 61 | 94 14 | 67.3 | 18.7 | 69.0 | 7 61 | 15.6 | 5.5 | 15.0 | JUN 21 |
| JUL 1 | 30.3 | 7.6 | 27.5 | 44.3 10 | 22.5 19 | 82 10 | 58.3 | 12.2 | 61.0 | 7 61 | 14.2 | 5.4 | 15.0 | JUL 1 |
| JUL 11 | 27.0 | 8.7 | 24.0 | 47.5 18 | 17.0 60 | 89 18 | 51.3 | 20.1 | 47.0 | 5 60 | 14.1 | 5.7 | 13.0 | JUL 11 |
| JUL 21 | 25.3 | 7.4 | 23.0 | 40.1 18 | 15.7 60 | 87 10 | 50.8 | 17.5 | 45.0 | 7 60 | 12.1 | 4.4 | 11.5 | JUL 21 |
| AUG 1 | 28.6 | 7.3 | 28.0 | 47.9 26 | 18.6 61 | 100 26 | 58.2 | 19.1 | 58.0 | 7 61 | 13.4 | 3.6 | 12.5 | AUG 1 |
| AUG 11 | 29.1 | 6.8 | 30.0 | 41.6 18 | 15.9 67 | 85 20 | 53.9 | 22.1 | 49.5 | 9 67 | 14.1 | 4.3 | 13.5 | AUG 11 |
| AUG 21 | 29.7 | 5.0 | 29.0 | 39.7 10 | 19.7 29 | 87 10 | 58.9 | 13.4 | 59.0 | 8 60 | 12.6 | 3.4 | 13.0 | AUG 21 |
| SEP 1 | 38.2 | 9.3 | 36.0 | 58.6 10 | 24.0 67 | 88 19 | 67.8 | 14.6 | 65.5 | 14 67 | 18.6 | 4.2 | 18.0 | SEP 1 |
| SEP 11 | 43.2 | 10.6 | 41.5 | 60.3 10 | 21.8 60 | 94 18 | 73.9 | 16.7 | 73.5 | 8 60 | 23.6 | 7.8 | 24.0 | SEP 11 |
| SEP 21 | 49.5 | 11.4 | 49.0 | 64.4 25 | 27.4 60 | 100 26 | 77.0 | 16.7 | 81.0 | 14 19 | 25.5 | 8.1 | 23.0 | SEP 21 |
| OCT 1 | 47.7 | 15.3 | 46.0 | 82.3 14 | 25.9 60 | 100 31 | 72.9 | 18.8 | 71.5 | 10 61 | 26.3 | 11.1 | 25.0 | OCT 1 |
| OCT 11 | 52.3 | 13.5 | 55.0 | 77.0 25 | 33.5 61 | 100 34 | 78.0 | 17.7 | 82.5 | 12 61 | 29.1 | 10.2 | 27.5 | OCT 11 |
| OCT 21 | 58.6 | 12.6 | 53.0 | 80.4 19 | 43.3 60 | 100 25 | 81.6 | 13.0 | 80.0 | 1 18 | 37.4 | 15.3 | 39.0 | OCT 21 |
| MONTH | | | | | | MONTH | | | | | | | | MONTH |
| MONTH | MEAN | STD. DEV. | MEDIAN | HIGHEST AVG, YR | LOWEST AVG, YR | HIGH, YR | AUG. HIGH | STD. DEV. | MEDIAN HIGH | LOW, YR | AUG. LOW | STD. DEV. | MEDIAN LOW | |
| MAY | 38.8 | 6.5 | 36.5 | 53.3 29 | 31.9 34 | 100 26 | 86.0 | 10.8 | 84.0 | 7 19 | 14.9 | 5.3 | 15.5 | MAY |
| JUN | 36.9 | 7.8 | 35.5 | 50.0 67 | 21.3 61 | 94 34 | 83.4 | 9.3 | 84.0 | 6 61 | 14.0 | 4.6 | 12.5 | JUN |
| JUL | 27.5 | 5.1 | 28.5 | 37.3 18 | 19.6 60 | 89 18 | 65.8 | 15.3 | 64.5 | 5 60 | 10.0 | 3.5 | 9.5 | JUL |
| AUG | 29.1 | 5.0 | 30.0 | 36.9 26 | 21.4 67 | 100 26 | 70.9 | 13.8 | 66.5 | 7 61 | 10.3 | 2.2 | 10.0 | AUG |
| SEP | 43.6 | 8.3 | 42.5 | 56.9 10 | 27.4 60 | 100 26 | 83.4 | 12.8 | 85.5 | 8 60 | 17.1 | 4.3 | 17.5 | SEP |
| OCT | 52.9 | 11.9 | 48.5 | 76.0 25 | 36.5 60 | 100 34 | 92.7 | 9.2 | 100.0 | 1 18 | 21.4 | 10.2 | 23.5 | OCT |

Table 3: 5 pm relative humidity summary table. Helena, 1910-1967
Selected Years

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

HELENA AIRPORT

1918-1967

10-DAY AND MONTHLY PERIOD MEANS

10-DAY AND MONTHLY EXTREME DAILY VALUES

| PRD. NO. | | MEAN | STD. DEV. | MEDIAN | HIGHEST AVG, YR | LOWEST AVG, YR | HIGH, YR | AVG. HIGH | STD. DEV. | MEDIAN HIGH | LOW, YR | AVG. LOW | STD. DEV. | MEDIAN LOW | PRD. BEGINS |
|----------|-------|------|-----------|--------|-----------------|----------------|----------|-----------|-----------|-------------|---------|----------|-----------|------------|-------------|
| MAY | 1 14 | 22.5 | 0.8 | 22.0 | 23.9 20 | 21.1 18 | I 26 20 | 24.6 | 0.6 | 24.5 | 19 18 | 20.8 | 1.2 | 20.0 | MAY 1 |
| MAY | 11 14 | 19.6 | 1.9 | 19.0 | 22.7 26 | 16.8 31 | I 25 26 | 21.4 | 2.1 | 21.0 | 16 31 | 18.0 | 1.6 | 18.0 | MAY 11 |
| MAY | 21 14 | 17.1 | 2.0 | 16.5 | 20.0 26 M | 14.0 19 | I 24 26 | 18.7 | 2.6 | 18.0 | 19 19 | 15.7 | 1.9 | 15.5 | MAY 21 |
| JUN | 1 14 | 16.3 | 2.7 | 15.5 | 21.4 17 | 12.9 19 | I 23 17 | 17.6 | 2.9 | 17.0 | 12 60 | 14.9 | 2.4 | 14.5 | JUN 1 |
| JUN | 11 14 | 15.0 | 2.7 | 15.5 | 20.2 67 | 12.1 18 | I 23 61 | 17.4 | 3.5 | 18.0 | 11 19 | 14.4 | 2.5 | 14.5 | JUN 11 |
| JUN | 21 14 | 14.9 | 2.9 | 14.0 | 20.0 61 M | 10.8 19 | I 24 61 | 16.4 | 4.0 | 15.5 | 10 19 | 13.6 | 2.2 | 13.5 | JUN 21 |
| JUL | 1 14 | 13.7 | 2.7 | 13.5 | 20.5 61 | 10.3 60 | I 23 61 | 14.6 | 3.2 | 15.0 | 9 60 | 12.0 | 2.6 | 13.0 | JUL 1 |
| JUL | 11 14 | 12.4 | 1.8 | 12.0 | 16.4 61 | 9.2 19 | I 18 61 | 13.4 | 2.1 | 13.0 | 8 19 | 11.3 | 1.8 | 11.0 | JUL 11 |
| JUL | 21 14 | 11.0 | 2.0 | 11.0 | 15.4 10 | 8.0 19 | I 16 10 | 11.0 | 2.0 | 12.0 | 8 29 | 10.4 | 1.9 | 10.5 | JUL 21 |
| AUG | 1 14 | 10.2 | 1.5 | 10.0 | 14.2 18 | 8.4 17 M | I 15 18 | 11.0 | 1.8 | 11.0 | 8 29 | 9.7 | 1.5 | 10.0 | AUG 1 |
| AUG | 11 14 | 10.3 | 1.6 | 10.0 | 13.7 18 | 7.8 29 | I 14 10 | 11.0 | 1.6 | 11.0 | 7 29 | 9.7 | 1.5 | 9.5 | AUG 11 |
| AUG | 21 14 | 10.3 | 1.8 | 10.0 | 13.4 18 | 7.0 29 | I 15 18 | 11.1 | 2.2 | 11.0 | 7 29 | 9.6 | 1.5 | 10.0 | AUG 21 |
| SEP | 1 14 | 11.1 | 1.0 | 11.0 | 14.1 10 | 8.0 29 | I 16 26 | 12.0 | 2.0 | 12.0 | 7 29 | 10.3 | 1.9 | 10.5 | SEP 1 |
| SEP | 11 14 | 13.1 | 2.0 | 12.0 | 17.1 26 | 9.9 29 | I 24 61 | 14.6 | 3.5 | 13.5 | 9 29 | 12.0 | 1.8 | 12.0 | SEP 11 |
| SEP | 21 14 | 14.9 | 2.0 | 14.0 | 18.6 10 | 11.1 19 | I 25 61 | 16.5 | 3.5 | 16.5 | 11 29 | 13.9 | 2.3 | 13.5 | SEP 21 |
| OCT | 1 14 | 15.6 | 2.3 | 15.5 | 20.3 25 | 11.4 60 | I 21 25 | 16.4 | 2.4 | 16.5 | 11 60 | 14.6 | 2.1 | 14.5 | OCT 1 |
| OCT | 11 14 | 16.1 | 2.5 | 15.0 | 22.5 25 | 12.7 60 | I 23 25 | 16.9 | 2.5 | 16.0 | 12 60 | 15.4 | 2.5 | 15.0 | OCT 11 |
| OCT | 21 14 | 16.9 | 2.7 | 16.5 | 24.0 25 M | 14.0 31 M | I 26 25 | 17.5 | 3.1 | 17.0 | 13 60 | 16.1 | 2.7 | 16.0 | OCT 21 |

| MONTH | | | | | | | | | | | | | | MONTH | | | | | | | | | | | | | |
|-------|----|------|-----|------|------|----|---|------|----|---|----|----|------|-------|------|----|----|------|-----|------|-----|--|--|--|--|--|--|
| MAY | 14 | 19.7 | 1.3 | 19.0 | 22.2 | 26 | M | 17.8 | 31 | I | 26 | 20 | 24.6 | 0.6 | 24.5 | 13 | 19 | 15.6 | 1.7 | 15.5 | MAY | | | | | | |
| JUN | 14 | 15.7 | 2.4 | 16.0 | 18.8 | 67 | | 12.1 | 19 | I | 24 | 61 | 18.7 | 3.7 | 19.0 | 10 | 19 | 13.1 | 1.9 | 13.0 | JUN | | | | | | |
| JUL | 14 | 12.3 | 1.9 | 12.0 | 16.7 | 61 | | 9.2 | 19 | I | 23 | 61 | 15.1 | 2.9 | 15.0 | 8 | 29 | 10.1 | 1.5 | 10.0 | JUL | | | | | | |
| AUG | 14 | 10.3 | 1.5 | 10.0 | 13.7 | 18 | | 7.8 | 29 | I | 15 | 18 | 11.7 | 1.7 | 12.0 | 7 | 29 | 9.2 | 1.3 | 9.0 | AUG | | | | | | |
| SEP | 14 | 13.0 | 1.9 | 12.0 | 16.9 | 26 | | 10.1 | 19 | I | 25 | 61 | 16.5 | 3.5 | 16.5 | 7 | 29 | 10.2 | 1.0 | 10.5 | SEP | | | | | | |
| OCT | 14 | 16.2 | 2.2 | 15.0 | 22.3 | 25 | M | 12.7 | 60 | M | 26 | 25 | 18.4 | 2.7 | 18.0 | 11 | 60 | 14.1 | 1.8 | 14.0 | OCT | | | | | | |

Table 4: FM1000 summary table. Helena, 1910-1967, selected years.

1978 NFDRS ENERGY RELEASE

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 244055

HELENA AIRPORT

1910-1967

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | | |
|---------------------------------|------|--------------|--------|-------------------|------------------|-----------------------------|---------|--------------|--------------|----------------|--|--------|-------------|--------------|---------------|----------------|
| PRD. BEGINS | MEAN | STD. DEV. | MEDIAN | HIGHEST AVG.YR | LOWEST AVG.YR | | HIGH.YR | AVG. HIGH | STD. DEV. | MEDIAN HIGH | | LOW.YR | AVG. LOW | STD. DEV. | MEDIAN LOW | PRD. BEGINS |
| MAY 1 | 24.4 | 3.8 | 25.0 | 31.0 18 | 16.5 29 | I | 39 31 | 33.0 | 5.4 | 35.0 | | 9 26 | 15.6 | 3.6 | 15.5 | MAY 1 |
| MAY 11 | 33.1 | 6.8 | 33.5 | 43.6 31 | 23.2 26 | I | 51 19 | 40.1 | 6.9 | 41.0 | | 12 26 | 25.1 | 7.9 | 25.5 | MAY 11 |
| MAY 21 | 39.5 | 8.8 | 42.0 | 53.1 19 | 19.8 17 | I | 60 19 | 47.2 | 9.3 | 50.0 | | 11 17 | 30.3 | 8.0 | 32.0 | MAY 21 |
| JUN 1 | 41.2 | 11.8 | 44.0 | 55.1 60 | 21.3 25 | I | 65 18 | 49.1 | 11.5 | 51.0 | | 16 25 | 32.5 | 11.2 | 34.5 | JUN 1 |
| JUN 11 | 41.9 | 11.2 | 37.0 | 57.9 18 | 23.8 67 | I | 65 18 | 49.7 | 11.6 | 50.0 | | 18 67 | 32.9 | 10.5 | 30.0 | JUN 11 |
| JUN 21 | 43.6 | 11.8 | 45.0 | 61.3 19 | 19.0 26 | I | 69 19 | 50.8 | 13.6 | 51.5 | | 17 61 | 34.8 | 9.6 | 36.0 | JUN 21 |
| JUL 1 | 51.1 | 10.2 | 50.0 | 65.9 60 | 34.5 61 | I | 78 60 | 58.1 | 10.8 | 58.0 | | 31 61 | 42.3 | 8.0 | 43.0 | JUL 1 |
| JUL 11 | 57.1 | 8.9 | 58.5 | 74.2 19 | 44.0 18 | I | 81 19 | 64.3 | 8.8 | 64.5 | | 34 18 | 48.4 | 9.4 | 48.5 | JUL 11 |
| JUL 21 | 63.7 | 11.2 | 62.0 | 79.4 29 | 40.7 18 | I | 86 29 | 70.1 | 10.5 | 69.0 | | 32 18 | 55.6 | 12.6 | 52.5 | JUL 21 |
| AUG 1 | 64.5 | 7.1 | 66.0 | 70.9 14 | 47.8 18 | I | 84 17 | 70.9 | 7.6 | 73.0 | | 42 26 | 55.7 | 7.2 | 59.0 | AUG 1 |
| AUG 11 | 63.7 | 9.8 | 65.0 | 79.9 29 | 46.8 18 | I | 83 29 | 70.9 | 8.6 | 73.5 | | 36 18 | 56.1 | 11.8 | 58.0 | AUG 11 |
| AUG 21 | 63.8 | 8.7 | 61.0 | 82.5 29 | 51.7 60 | I | 86 29 | 71.8 | 7.1 | 72.0 | | 40 60 | 54.2 | 11.3 | 52.0 | AUG 21 |
| SEP 1 | 55.8 | 9.2 | 55.0 | 69.3 29 | 37.3 10 | I | 79 29 | 63.4 | 9.6 | 63.0 | | 28 26 | 46.9 | 9.5 | 48.0 | SEP 1 |
| SEP 11 | 45.2 | 10.6 | 46.5 | 60.6 29 | 22.0 61 | I | 65 29 | 51.4 | 11.5 | 51.0 | | 22 61 | 38.3 | 10.1 | 37.0 | SEP 11 |
| SEP 21 | 37.8 | 10.4 | 36.0 | 53.8 60 | 18.0 61 | I | 64 19 | 46.3 | 11.8 | 47.0 | | 18 61 | 30.7 | 9.3 | 31.0 | SEP 21 |
| OCT 1 | 36.6 | 10.3 | 36.0 | 59.5 60 | 19.6 25 | I | 65 60 | 45.1 | 9.8 | 43.5 | | 14 25 | 31.9 | 10.5 | 30.0 | OCT 1 |
| OCT 11 | 35.8 | 9.1 | 35.5 | 46.7 60 | 13.7 25 | I | 55 60 | 43.6 | 9.9 | 45.5 | | 12 25 | 29.6 | 8.9 | 29.5 | OCT 11 |
| OCT 21 | 32.4 | 10.0 | 33.5 | 43.3 18 | 11.6 25 | I | 51 18 | 37.5 | 10.6 | 38.5 | | 8 25 | 27.9 | 9.3 | 29.5 | OCT 21 |
| | | | | | | | | | | | | | | | | |
| MONTH | | | | | | I | | | | | | | | | | MONTH |
| MAY 1 | 32.7 | 5.2 | 32.0 | 40.8 19 | 23.9 26 | I | 60 19 | 47.1 | 8.1 | 49.0 | | 9 26 | 17.7 | 6.7 | 17.0 | MAY |
| JUN 1 | 40.9 | 11.5 | 40.0 | 56.3 60 | 19.0 26 | I | 69 19 | 53.2 | 13.5 | 55.0 | | 16 25 | 28.2 | 10.3 | 26.0 | JUN |
| JUL 1 | 57.5 | 8.2 | 56.5 | 72.4 19 | 44.5 61 | I | 86 29 | 72.1 | 8.4 | 71.0 | | 31 61 | 40.2 | 7.9 | 37.5 | JUL |
| AUG 1 | 64.0 | 7.4 | 64.0 | 77.6 29 | 49.5 18 | I | 86 29 | 75.4 | 6.4 | 74.5 | | 36 18 | 49.8 | 8.1 | 49.5 | AUG |
| SEP 1 | 44.0 | 12.1 | 46.5 | 58.9 19 | 18.0 61 | I | 79 29 | 59.3 | 17.3 | 63.0 | | 18 61 | 29.4 | 8.1 | 30.5 | SEP |
| OCT 1 | 35.6 | 8.7 | 35.0 | 49.6 60 | 15.0 25 | I | 65 60 | 47.4 | 9.3 | 48.0 | | 8 25 | 23.9 | 7.0 | 26.0 | OCT |

Table 5: 1978 NFDRS ERC. Helena, 1910-67, selected years (G/3)

1978 NFDRS EMISSION RELEASE

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 24-050

HELENA AIRPORT

1955-1977

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | |
|---------------------------------|------|--------------|--------|--------------------|-------------------|-----------------------------|--------------|--------------|----------------|---------|-------------|--------------|---------------|----------------|-------|
| PRD. BEGINS | YEAR | STD. DEV. | MEDIAN | HIGHEST AVG. YR | LOWEST AVG. YR | I HIGH, YR | AVG. HIGH | STD. DEV. | MEDIAN HIGH | LOW, YR | AVG. LOW | STD. DEV. | MEDIAN LOW | PRD. BEGINS | |
| MAY 1 | 41.2 | 11.1 | 42.0 | 60.6 74 | 26.2 56 | I 66 74 | 50.2 | 10.2 | 52.0 | 11 64 | 29.1 | 11.4 | 31.0 | MAY 1 | |
| MAY 11 | 42.9 | 10.5 | 41.2 | 64.9 73 | 24.7 75 | I 71 73 | 53.0 | 7.5 | 52.0 | 18 57 | 31.0 | 9.1 | 30.0 | MAY 11 | |
| MAY 21 | 42.7 | 8.3 | 41.4 | 60.3 66 | 24.2 62 | I 70 73 | 52.1 | 8.3 | 50.0 | 9 62 | 30.5 | 8.9 | 30.0 | MAY 21 | |
| JUN 1 | 43.3 | 7.7 | 44.0 | 63.8 73 | 27.0 59 | I 74 73 | 52.5 | 8.6 | 55.0 | 13 58 | 32.1 | 11.5 | 34.0 | JUN 1 | |
| JUN 11 | 46.9 | 11.0 | 39.0 | 60.2 74 | 21.7 58 | I 73 73 | 50.5 | 12.3 | 50.0 | 12 62 | 27.8 | 11.8 | 24.0 | JUN 11 | |
| JUN 21 | 42.6 | 12.1 | 43.0 | 70.1 61 | 26.5 69 | I 79 61 | 52.2 | 12.0 | 53.0 | 13 69 | 29.7 | 11.2 | 30.0 | JUN 21 | |
| JUL 1 | 47.0 | 12.4 | 48.0 | 69.3 73 | 24.7 58 | I 77 73 | 55.5 | 13.3 | 57.0 | 16 55 | 37.7 | 12.6 | 38.0 | JUL 1 | |
| JUL 11 | 51.3 | 12.1 | 53.0 | 72.2 73 | 25.5 55 | I 82 73 | 58.5 | 12.1 | 59.0 | 14 55 | 41.1 | 12.7 | 42.0 | JUL 11 | |
| JUL 21 | 56.4 | 11.8 | 58.0 | 77.9 74 | 28.7 55 | I 83 73 | 65.1 | 10.7 | 66.0 | 23 55 | 49.0 | 13.0 | 47.0 | JUL 21 | |
| AUG 1 | 59.6 | 9.8 | 61.0 | 76.3 73 | 40.4 75 | I 85 73 | 67.4 | 10.4 | 68.0 | 33 76 | 49.1 | 10.6 | 47.0 | AUG 1 | |
| AUG 11 | 58.7 | 11.7 | 59.0 | 78.5 73 | 34.4 75 | I 83 73 | 67.4 | 9.9 | 67.5 | 17 75 | 46.3 | 13.7 | 48.5 | AUG 11 | |
| AUG 21 | 53.0 | 11.4 | 55.0 | 71.9 69 | 29.9 75 | I 80 73 | 62.8 | 11.5 | 65.0 | 21 65 | 40.8 | 13.5 | 39.5 | AUG 21 | |
| SEP 1 | 52.6 | 10.9 | 52.5 | 68.9 66 | 34.6 65 | I 75 66 | 59.7 | 10.6 | 61.0 | 15 65 | 42.8 | 12.7 | 44.0 | SEP 1 | |
| SEP 11 | 46.6 | 9.0 | 48.5 | 59.4 58 | 18.2 65 | I 68 58 | 55.3 | 9.8 | 58.0 | 11 65 | 34.2 | 10.4 | 36.0 | SEP 11 | |
| SEP 21 | 43.1 | 9.0 | 45.0 | 53.7 66 | 19.6 65 | I 63 58 | 49.7 | 9.2 | 51.0 | 10 65 | 34.0 | 10.0 | 33.5 | SEP 21 | |
| OCT 1 | 42.6 | 8.3 | 44.5 | 55.1 60 | 26.9 77 | I 62 72 | 50.5 | 8.5 | 52.5 | 20 67 | 32.6 | 8.5 | 32.5 | OCT 1 | |
| OCT 11 | 37.1 | 7.9 | 35.5 | 52.5 58 | 21.6 75 | I 62 58 | 43.8 | 8.6 | 44.0 | 12 75 | 29.4 | 9.9 | 31.0 | OCT 11 | |
| OCT 21 | 33.6 | 9.0 | 34.0 | 43.4 73 | 20.5 75 | I 48 58 | 40.6 | 5.4 | 41.0 | 11 75 | 26.1 | 7.9 | 27.0 | OCT 21 | |
| MONTH | | | | | | I | | | | | | | | | MONTH |
| MAY | 42.3 | 6.6 | 42.0 | 57.6 73 | 29.7 75 | I 71 73 | 57.1 | 6.7 | 57.0 | 9 62 | 23.0 | 8.4 | 24.0 | MAY | |
| JUN | 42.1 | 9.6 | 39.0 | 60.6 73 | 25.3 59 | I 79 61 | 57.0 | 9.3 | 55.0 | 12 62 | 23.5 | 9.4 | 23.0 | JUN | |
| JUL | 52.5 | 11.4 | 52.0 | 74.5 73 | 26.9 55 | I 83 73 | 65.4 | 10.7 | 66.0 | 14 55 | 35.8 | 12.0 | 36.0 | JUL | |
| AUG | 57.5 | 9.7 | 58.0 | 73.0 73 | 34.7 75 | I 85 73 | 70.9 | 9.2 | 71.0 | 17 75 | 37.9 | 12.4 | 39.0 | AUG | |
| SEP | 47.4 | 6.4 | 46.5 | 59.4 58 | 24.1 65 | I 75 66 | 62.3 | 8.3 | 62.0 | 10 65 | 30.0 | 8.1 | 30.0 | SEP | |
| OCT | 37.0 | 6.4 | 38.0 | 48.6 58 | 26.6 75 | I 62 72 | 51.3 | 7.9 | 53.0 | 11 75 | 23.2 | 7.9 | 20.5 | OCT | |

Table 5a: 1978 NFDRS ERC, Helena, 1955-77, all years (G/3)

WIND SPEED - 5PM

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 244055

HELENA AIRPORT

1910-1967

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | |
|---------------------------------|------|------|---------|---------|--------|---|-----------------------------|------|------|--------|--------|------|------|--------|--------|
| PRD. | STD. | | HIGHEST | LOWEST | | | | AVG. | STD. | MEDIAN | | AVG. | STD. | MEDIAN | PRD. |
| BEGINS | MEAN | DEV. | MEDIAN | AVG,YR | AVG,YR | | HIGH,YR | HIGH | DEV. | HIGH | LOW,YR | LOW | DEV. | LOW | BEGINS |
| MAY 1 | 10.4 | 2.1 | 10.0 | 15.3 60 | 7.7 29 | 1 | 24 60 | 17.5 | 4.0 | 17.0 | 2 31 | 3.9 | 1.3 | 4.0 | MAY 1 |
| MAY 11 | 10.7 | 1.8 | 10.0 | 15.4 60 | 7.2 29 | 1 | 32 25 | 22.0 | 5.7 | 21.0 | 0 20 | 4.0 | 1.9 | 4.0 | MAY 11 |
| MAY 21 | 11.3 | 2.7 | 10.0 | 15.5 26 | 7.0 17 | 1 | 40 26 | 22.4 | 6.4 | 20.0 | 3 34 | 4.4 | 1.5 | 4.0 | MAY 21 |
| JUN 1 | 9.9 | 2.5 | 8.5 | 15.0 60 | 7.1 31 | 1 | 31 60 | 17.5 | 5.6 | 17.0 | 2 20 | 3.8 | 1.3 | 3.5 | JUN 1 |
| JUN 11 | 10.6 | 2.6 | 9.5 | 18.5 60 | 7.8 26 | 1 | 31 60 | 19.2 | 6.1 | 16.0 | 2 25 | 3.9 | 1.7 | 3.0 | JUN 11 |
| JUN 21 | 10.3 | 3.3 | 9.5 | 17.9 61 | 5.4 20 | 1 | 26 25 | 17.9 | 4.9 | 18.5 | 2 20 | 3.6 | 1.1 | 4.0 | JUN 21 |
| JUL 1 | 10.4 | 1.5 | 10.0 | 13.5 67 | 7.2 26 | 1 | 30 17 | 19.4 | 4.9 | 20.0 | 2 26 | 3.7 | 1.1 | 3.5 | JUL 1 |
| JUL 11 | 9.8 | 2.4 | 9.5 | 12.6 17 | 6.2 29 | 1 | 35 17 | 18.8 | 6.7 | 17.5 | 2 31 | 3.7 | 1.7 | 3.5 | JUL 11 |
| JUL 21 | 10.4 | 1.9 | 10.0 | 13.6 19 | 7.4 18 | 1 | 25 26 | 18.7 | 4.2 | 18.0 | 3 29 | 4.6 | 1.1 | 4.5 | JUL 21 |
| AUG 1 | 9.6 | 2.3 | 9.0 | 13.1 60 | 5.7 29 | 1 | 34 19 | 19.2 | 7.2 | 18.5 | 2 61 | 3.6 | 1.5 | 3.0 | AUG 1 |
| AUG 11 | 9.2 | 2.0 | 9.0 | 14.3 60 | 5.8 17 | 1 | 24 20 | 17.7 | 3.7 | 18.0 | 1 61 | 3.1 | 1.9 | 2.5 | AUG 11 |
| AUG 21 | 10.3 | 2.5 | 10.0 | 15.4 60 | 7.3 10 | 1 | 24 20 | 17.9 | 4.2 | 17.5 | 1 10 | 3.0 | 1.9 | 3.5 | AUG 21 |
| SEP 1 | 8.7 | 2.3 | 8.5 | 12.6 67 | 5.3 20 | 1 | 24 25 | 17.3 | 4.9 | 18.0 | 2 61 | 3.5 | 1.9 | 3.0 | SEP 1 |
| SEP 11 | 8.8 | 3.0 | 8.5 | 12.8 61 | 4.6 10 | 1 | 28 31 | 16.9 | 6.0 | 15.5 | 1 29 | 3.1 | 1.8 | 2.0 | SEP 11 |
| SEP 21 | 7.8 | 2.3 | 6.5 | 12.3 60 | 4.6 25 | 1 | 28 31 | 15.9 | 6.3 | 13.5 | 1 29 | 2.7 | 1.7 | 2.0 | SEP 21 |
| OCT 1 | 7.9 | 1.6 | 7.0 | 12.3 61 | 5.7 14 | 1 | 20 17 | 14.6 | 2.8 | 15.0 | 0 60 | 2.9 | 1.6 | 3.0 | OCT 1 |
| OCT 11 | 8.4 | 2.6 | 8.0 | 13.2 60 | 4.1 25 | 1 | 24 20 | 16.0 | 4.6 | 15.0 | 1 31 | 2.9 | 1.1 | 3.0 | OCT 11 |
| OCT 21 | 8.9 | 1.4 | 8.0 | 11.7 67 | 6.3 25 | 1 | 24 10 | 17.4 | 4.2 | 17.5 | 2 67 | 2.7 | 1.1 | 2.0 | OCT 21 |
| MONTH | | | | | | 1 | | | | | | | | | MONTH |
| MAY | 10.8 | 1.8 | 9.5 | 15.2 60 | 8.4 29 | 1 | 40 26 | 24.7 | 6.8 | 23.0 | 0 20 | 2.9 | 1.2 | 3.0 | MAY |
| JUN | 10.3 | 2.1 | 9.5 | 14.8 60 | 7.4 20 | 1 | 31 60 | 22.4 | 4.6 | 21.0 | 2 25 | 2.8 | 0.6 | 3.0 | JUN |
| JUL | 10.2 | 1.5 | 10.0 | 12.6 61 | 8.1 29 | 1 | 35 17 | 23.1 | 4.9 | 23.0 | 2 31 | 3.2 | 1.2 | 3.0 | JUL |
| AUG | 9.6 | 1.7 | 9.0 | 14.3 60 | 7.9 29 | 1 | 34 19 | 22.2 | 4.9 | 22.5 | 1 61 | 2.3 | 1.0 | 2.0 | AUG |
| SEP | 8.4 | 2.1 | 7.5 | 11.8 60 | 5.8 29 | 1 | 28 31 | 21.0 | 4.0 | 21.5 | 1 29 | 2.4 | 1.5 | 2.0 | SEP |
| OCT | 8.4 | 1.6 | 7.5 | 11.4 61 | 5.9 25 | 1 | 24 20 | 19.1 | 3.7 | 20.0 | 0 60 | 1.9 | 0.7 | 2.0 | OCT |

Table 6. 5 pm wind speed at Helena, 1910-67, selected years.

STATION NUMBER 244055

HELENA AIRPORT

1955-1977

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | |
|---------------------------------|------|------|---------|---------|---------|---|-----------------------------|------|------|--------|--|---------|-----|------|--------|--------|
| PRD. | MEAN | STD. | HIGHEST | LOWEST | | | | | | | | | | | | |
| BEGINS | | DEV. | MEDIAN | AVG, YR | AVG, YR | | HIGH, YR | HIGH | STD. | MEDIAN | | LOW, YR | LOW | STD. | MEDIAN | PRD. |
| | | | | | | | | | DEV. | HIGH | | | | DEV. | LOW | BEGINS |
| MAY 1 | 12.2 | 2.8 | 11.0 | 19.8 55 | 8.5 75 | 1 | 28 59 | 20.7 | 3.9 | 20.0 | | 2 59 | 4.8 | 2.1 | 4.0 | MAY 1 |
| MAY 11 | 12.5 | 1.8 | 11.0 | 16.5 76 | 10.4 67 | 1 | 28 60 | 21.6 | 3.7 | 23.0 | | 2 59 | 4.6 | 2.1 | 4.0 | MAY 11 |
| MAY 21 | 11.7 | 2.6 | 11.0 | 16.4 66 | 7.5 70 | 1 | 28 61 | 21.2 | 4.3 | 21.0 | | 0 59 | 4.0 | 2.5 | 4.0 | MAY 21 |
| JUN 1 | 11.2 | 2.7 | 10.0 | 18.7 73 | 7.5 67 | 1 | 31 60 | 19.1 | 3.7 | 18.0 | | 0 75 | 4.2 | 2.6 | 4.0 | JUN 1 |
| JUN 11 | 12.1 | 2.3 | 12.0 | 18.1 60 | 7.9 58 | 1 | 36 59 | 22.0 | 5.0 | 21.0 | | 0 70 | 4.7 | 2.6 | 4.0 | JUN 11 |
| JUN 21 | 12.9 | 2.0 | 13.0 | 16.9 56 | 9.6 71 | 1 | 32 68 | 22.3 | 3.7 | 23.0 | | 0 75 | 4.2 | 2.6 | 4.0 | JUN 21 |
| JUL 1 | 12.1 | 2.4 | 12.0 | 16.0 77 | 7.6 68 | 1 | 34 64 | 21.5 | 5.4 | 20.0 | | 1 55 | 5.0 | 1.7 | 5.0 | JUL 1 |
| JUL 11 | 11.7 | 1.4 | 11.0 | 13.9 55 | 8.7 69 | 1 | 28 60 | 22.1 | 3.9 | 23.0 | | 0 72 | 3.7 | 1.3 | 4.0 | JUL 11 |
| JUL 21 | 11.1 | 1.6 | 11.0 | 13.5 77 | 7.5 65 | 1 | 27 70 | 20.1 | 3.2 | 19.0 | | 0 75 | 4.3 | 2.3 | 4.0 | JUL 21 |
| AUG 1 | 11.4 | 2.2 | 11.0 | 17.8 57 | 7.5 74 | 1 | 34 58 | 21.2 | 4.1 | 20.0 | | 0 74 | 3.7 | 2.1 | 4.0 | AUG 1 |
| AUG 11 | 11.2 | 2.2 | 10.0 | 15.7 59 | 7.0 61 | 1 | 32 55 | 20.4 | 4.8 | 18.5 | | 0 75 | 4.5 | 2.0 | 5.0 | AUG 11 |
| AUG 21 | 11.4 | 2.0 | 11.0 | 14.6 60 | 7.5 74 | 1 | 31 65 | 21.0 | 5.0 | 20.0 | | 0 74 | 3.5 | 2.1 | 4.0 | AUG 21 |
| SEP 1 | 10.9 | 2.2 | 10.5 | 15.2 73 | 7.5 76 | 1 | 32 73 | 20.8 | 4.9 | 20.0 | | 0 74 | 4.4 | 2.7 | 4.0 | SEP 1 |
| SEP 11 | 10.9 | 2.1 | 10.0 | 14.9 72 | 7.0 75 | 1 | 27 71 | 20.6 | 4.3 | 20.0 | | 0 77 | 2.4 | 2.1 | 2.5 | SEP 11 |
| SEP 21 | 10.2 | 2.1 | 10.0 | 13.5 64 | 5.2 76 | 1 | 27 64 | 18.1 | 4.3 | 18.0 | | 0 75 | 2.9 | 1.6 | 3.0 | SEP 21 |
| OCT 1 | 9.9 | 2.1 | 9.5 | 13.2 69 | 6.5 71 | 1 | 31 64 | 18.7 | 3.9 | 18.0 | | 0 77 | 2.9 | 1.9 | 3.0 | OCT 1 |
| OCT 11 | 9.1 | 2.3 | 8.0 | 13.0 66 | 4.6 72 | 1 | 26 58 | 18.1 | 3.9 | 18.0 | | 0 74 | 2.4 | 1.7 | 2.5 | OCT 11 |
| OCT 21 | 8.6 | 2.5 | 8.0 | 12.9 73 | 4.9 76 | 1 | 25 60 | 18.2 | 5.0 | 19.0 | | 0 77 | 2.9 | 1.4 | 3.0 | OCT 21 |
| MONTH | | | | | | | | | | | | | | | | TH |
| Y | 12.1 | 1.7 | 12.0 | 15.6 55 | 9.8 69 | 1 | 28 61 | 24.7 | 2.4 | 25.0 | | 0 59 | 2.9 | 1.4 | 3.0 | MAY |
| JUN | 12.1 | 1.7 | 11.0 | 16.0 73 | 9.6 75 | 1 | 36 59 | 25.0 | 4.1 | 24.0 | | 0 75 | 2.3 | 1.3 | 3.0 | JUN |
| JUL | 11.7 | 1.3 | 11.0 | 14.3 77 | 9.2 65 | 1 | 34 64 | 25.2 | 3.4 | 25.0 | | 0 75 | 2.8 | 1.6 | 3.0 | JUL |
| AUG | 11.6 | 1.9 | 11.0 | 17.8 57 | 8.5 74 | 1 | 34 58 | 24.8 | 4.4 | 25.0 | | 0 75 | 2.5 | 1.6 | 3.0 | AUG |
| SEP | 10.7 | 1.7 | 10.5 | 13.0 58 | 6.7 76 | 1 | 32 73 | 23.5 | 3.9 | 24.0 | | 0 77 | 1.4 | 1.5 | 1.0 | SEP |
| OCT | 9.2 | 1.5 | 9.0 | 11.0 66 | 5.9 76 | 1 | 31 64 | 21.9 | 3.6 | 23.0 | | 0 77 | 1.5 | 1.3 | 2.0 | OCT |

Table 6a: 5 pm wind speed at Helena, 1955-77 all years

P R E C I P I T A T I O N

BY 10 (OR 11)-DAY AND MONTHLY PERIODS

STATION NUMBER 244558 KALISPELL AIRPORT YRS 1910-1967

| PERIOD REGNS | NO. YRS | MEAN TOTAL | 10-DAY AND MONTHLY TOTALS | | | HIGHEST TOT, YR | LOWEST TOT, YR | T I | MAXIMUM DAILY TOTALS | | | | |
|-----------------|------------|---------------|---------------------------|--------|------|--------------------|-------------------|--------|----------------------|------------|------------|--------|-------|
| | | | STD DEV | MEDIAN | | | | | EXTREME YR | AVG MAX | STD DEV | MEDIAN | |
| MAY 1 | 12 | 0.298 | 0.230 | 0.270 | 0.73 | 10 | 0.00 | 18 | 0.63 | 10 | 0.184 | 0.176 | 0.140 |
| MAY 11 | 12 | 0.286 | 0.191 | 0.265 | 0.66 | 26 | 0.00 | 14 | 0.36 | 10 | 0.165 | 0.102 | 0.155 |
| MAY 21 | 12 | 0.421 | 0.303 | 0.440 | 0.90 | 25 | 0.00 | 18 | 0.59 | 17 | 0.247 | 0.197 | 0.215 |
| JUN 1 | 11 | 0.566 | 0.547 | 0.280 | 1.43 | 17 | 0.00 | 19 | 0.61 | 34 | 0.282 | 0.246 | 0.140 |
| JUN 11 | 12 | 0.488 | 0.304 | 0.470 | 1.05 | 31 | 0.07 | 10 | 0.76 | 31 | 0.321 | 0.219 | 0.235 |
| JUN 21 | 12 | 0.540 | 0.592 | 0.310 | 1.75 | 34 | 0.00 | 29 | 1.01 | 34 | 0.320 | 0.328 | 0.210 |
| JUL 1 | 11 | 0.118 | 0.117 | 0.070 | 0.34 | 14 | 0.00 | 20 | 0.20 | 34 | 0.080 | 0.075 | 0.060 |
| JUL 11 | 12 | 0.132 | 0.157 | 0.070 | 0.45 | 19 | 0.00 | 34 | 0.45 | 19 | 0.114 | 0.143 | 0.060 |
| JUL 21 | 12 | 0.299 | 0.371 | 0.135 | 1.24 | 18 | 0.00 | 29 | 0.59 | 18 | 0.208 | 0.211 | 0.135 |
| AUG 1 | 11 | 0.182 | 0.378 | 0.010 | 1.24 | 20 | 0.00 | 29 | 1.06 | 20 | 0.144 | 0.315 | 0.010 |
| AUG 11 | 11 | 0.304 | 0.430 | 0.060 | 1.25 | 14 | 0.00 | 19 | 1.25 | 14 | 0.253 | 0.414 | 0.060 |
| AUG 21 | 12 | 0.313 | 0.526 | 0.070 | 1.82 | 26 | 0.00 | 34 | 1.05 | 26 | 0.198 | 0.301 | 0.065 |
| SEP 1 | 12 | 0.603 | 0.615 | 0.345 | 1.93 | 10 | 0.00 | 20 | 0.79 | 31 | 0.327 | 0.301 | 0.200 |
| SEP 11 | 11 | 0.368 | 0.455 | 0.140 | 1.42 | 31 | 0.00 | 18 | 0.66 | 31 | 0.194 | 0.233 | 0.080 |
| SEP 21 | 11 | 0.347 | 0.284 | 0.290 | 0.91 | 18 | 0.01 | 14 | 0.54 | 18 | 0.229 | 0.158 | 0.230 |
| OCT 1 | 12 | 0.448 | 0.820 | 0.145 | 2.94 | 14 | 0.00 | 17 | 1.31 | 14 | 0.224 | 0.361 | 0.095 |
| OCT 11 | 12 | 0.265 | 0.240 | 0.215 | 0.78 | 67 | 0.00 | 31 | 0.30 | 34 | 0.137 | 0.109 | 0.120 |
| OCT 21 | 12 | 0.500 | 0.471 | 0.375 | 1.84 | 34 | 0.07 | 25 | 0.63 | 34 | 0.243 | 0.158 | 0.190 |
| MONTH | | | | | | | | | T J | | | | |
| MAY | 12 | 1.005 | 0.414 | 0.960 | 1.72 | 19 | 0.43 | 18 | 0.63 | 10 | 0.349 | 0.161 | 0.340 |
| JUN | 10 | 1.662 | 0.991 | 1.765 | 2.96 | 34 | 0.40 | 13 | 1.01 | 34 | 0.513 | 0.290 | 0.500 |
| JUL | 11 | 0.536 | 0.433 | 0.430 | 1.47 | 18 | 0.07 | 67 | 0.59 | 18 | 0.260 | 0.169 | 0.200 |
| AUG | 10 | 0.722 | 0.621 | 0.495 | 2.61 | 20 | 0.01 | 67 | 1.25 | 14 | 0.397 | 0.441 | 0.210 |
| SEP | 10 | 1.261 | 0.927 | 0.765 | 2.89 | 31 | 0.33 | 67 | 0.79 | 31 | 0.385 | 0.233 | 0.310 |
| OCT | 12 | 1.213 | 0.871 | 0.980 | 3.40 | 14 | 0.44 | 31 | 1.31 | 14 | 0.380 | 0.322 | 0.280 |

Table 7: Precipitation Summary table, Kalispell, 1910-67, selected years

MAXIMUM DAILY TEMPERATURE

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 244565 KALISPELL AIRPORT

1910-1967

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | | | |
|---------------------------------|------|--------------|--------|--------------------|-------------------|-----------------------------|----------|--------------|--------------|----------------|--|---------|-------------|--------------|---------------|----------------|-------|
| PRD. BEGINS | MEAN | STD. DEV. | MEDIAN | HIGHEST AUG. YR | LOWEST AUG. YR | | HIGH, YR | AUG. HIGH | STD. DEV. | MEDIAN HIGH | | LOW, YR | AUG. LOW | STD. DEV. | MEDIAN LOW | PRD. BEGINS | |
| MAY 1 | 60.7 | 4.0 | 61.0 | 70.3 10 | 51.0 19 | I | 78 18 | 72.2 | 4.8 | 73.0 | | 41 28 | 49.4 | 4.7 | 49.5 | MAY 1 | |
| MAY 11 | 65.5 | 3.3 | 65.0 | 71.5 25 | 57.5 18 | I | 84 31 | 77.3 | 4.7 | 77.0 | | 43 67 | 53.3 | 6.5 | 52.5 | MAY 11 | |
| MAY 21 | 67.0 | 6.2 | 67.5 | 78.5 34 | 59.2 20 | I | 89 34 | 78.2 | 8.2 | 61.0 | | 47 19 | 54.3 | 5.5 | 56.0 | MAY 21 | |
| JUN 1 | 67.9 | 5.2 | 66.5 | 77.2 26 | 61.0 25 | I | 95 18 | 81.8 | 7.6 | 82.5 | | 45 17 | 54.1 | 7.1 | 53.0 | JUN 1 | |
| JUN 11 | 72.7 | 5.4 | 73.0 | 81.6 18 | 64.5 29 | I | 95 19 | 84.4 | 7.5 | 87.0 | | 52 17 | 60.6 | 6.0 | 63.5 | JUN 11 | |
| JUN 21 | 75.0 | 5.1 | 74.5 | 82.6 25 | 66.9 14 | I | 95 26 | 86.4 | 4.8 | 85.0 | | 57 14 | 63.0 | 4.2 | 63.0 | JUN 21 | |
| JUL 1 | 80.6 | 2.5 | 81.3 | 83.9 20 | 76.9 31 | I | 94 26 | 89.5 | 3.8 | 90.0 | | 67 34 | 78.5 | 3.1 | 78.0 | JUL 1 | |
| JUL 11 | 85.0 | 3.0 | 84.0 | 89.6 17 | 81.5 31 | I | 99 19 | 93.3 | 2.6 | 94.0 | | 68 29 | 74.8 | 4.9 | 74.5 | JUL 11 | |
| JUL 21 | 83.9 | 4.4 | 84.5 | 88.0 67 | 71.7 18 | I | 101 34 | 93.3 | 4.1 | 94.0 | | 56 18 | 71.8 | 6.3 | 72.0 | JUL 21 | |
| AUG 1 | 80.7 | 3.8 | 81.0 | 86.6 67 | 74.5 18 | I | 94 67 | 89.8 | 3.0 | 90.0 | | 59 18 | 69.3 | 7.4 | 69.5 | AUG 1 | |
| AUG 11 | 80.3 | 7.6 | 81.0 | 95.2 67 | 67.5 18 | I | 97 67 | 88.5 | 5.4 | 89.5 | | 52 25 | 69.1 | 11.1 | 69.0 | AUG 11 | |
| AUG 21 | 77.7 | 6.1 | 78.0 | 86.5 67 | 66.0 10 | I | 98 26 | 88.5 | 6.0 | 89.0 | | 51 26 | 65.8 | 9.3 | 68.5 | AUG 21 | |
| SEP 1 | 70.3 | 6.9 | 70.5 | 85.7 67 | 58.1 10 | I | 99 67 | 81.1 | 9.1 | 81.0 | | 51 10 | 58.3 | 7.6 | 56.5 | SEP 1 | |
| SEP 11 | 67.3 | 6.8 | 68.0 | 74.9 18 | 56.0 14 | I | 84 67 | 76.3 | 6.6 | 78.5 | | 44 25 | 55.4 | 7.7 | 55.0 | SEP 11 | |
| SEP 21 | 61.5 | 8.2 | 61.0 | 77.9 67 | 47.5 26 | I | 87 67 | 76.2 | 8.4 | 77.5 | | 28 26 | 47.4 | 9.7 | 49.0 | SEP 21 | |
| OCT 1 | 58.7 | 6.1 | 59.5 | 69.7 17 | 48.7 14 | I | 77 17 | 69.8 | 6.1 | 71.5 | | 30 19 | 48.4 | 9.2 | 50.0 | OCT 1 | |
| OCT 11 | 56.1 | 3.7 | 56.0 | 60.7 18 | 47.7 20 | I | 74 34 | 66.2 | 6.0 | 64.5 | | 40 17 | 47.2 | 4.8 | 46.5 | OCT 11 | |
| OCT 21 | 46.7 | 6.4 | 47.0 | 55.9 26 | 32.1 19 | I | 65 25 | 58.3 | 4.8 | 57.0 | | 23 19 | 37.1 | 8.4 | 39.5 | OCT 21 | |
| MONTH | | | | | | I | | | | | | | | | | | MONTH |
| MAY | 64.5 | 3.5 | 63.0 | 69.8 34 | 58.3 20 | I | 89 34 | 81.2 | 5.3 | 83.0 | | 41 20 | 48.8 | 4.8 | 48.5 | MAY | |
| JUN | 71.8 | 3.0 | 71.5 | 76.9 18 | 66.8 20 | I | 95 26 | 89.6 | 4.1 | 89.5 | | 45 17 | 52.7 | 4.7 | 53.0 | JUN | |
| JUL | 83.2 | 2.0 | 83.0 | 86.1 67 | 78.5 18 | I | 101 34 | 95.8 | 2.5 | 95.5 | | 56 18 | 68.5 | 4.7 | 68.5 | JUL | |
| AUG | 79.5 | 4.9 | 79.0 | 89.4 67 | 72.3 18 | I | 98 26 | 92.3 | 3.4 | 93.0 | | 51 20 | 61.7 | 8.0 | 60.5 | AUG | |
| SEP | 66.4 | 5.5 | 64.5 | 79.2 67 | 56.3 26 | I | 99 67 | 84.3 | 6.5 | 84.0 | | 28 26 | 46.3 | 8.6 | 48.0 | SEP | |
| OCT | 53.8 | 3.9 | 55.0 | 58.5 29 | 46.9 19 | I | 77 17 | 71.1 | 4.3 | 72.5 | | 23 19 | 36.8 | 8.3 | 39.0 | OCT | |

Table 8: Maximum daily temperature summary table, Kalispell, 1910-67, selected years

RELATIVE HUMIDITY 5 P.M.

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 244558 KALISPELL AIRPORT

1910-1967

10-DAY AND MONTHLY PERIOD MEANS

10-DAY AND MONTHLY EXTREMES

| PRD. BEGINS | MEAN | STD. DEV. | MEDIAN | HIGHEST AVG.YR | LOWEST AVG.YR | HIGH.YR | AVG. HIGH | STD. DEV. | MEDIAN HIGH | LOW.YR | AVG. LOW | STD. DEV. | MEDIAN LOW | PRD. BEGINS |
|----------------|------|--------------|--------|-------------------|------------------|---------|--------------|--------------|----------------|--------|-------------|--------------|---------------|----------------|
| MAY 1 | 40.1 | 8.4 | 41.5 | 48.8 14 | 26.2 25 | 93 19 | 78.7 | 14.0 | 73.5 | 12 17 | 20.9 | 4.5 | 20.5 | MAY 1 |
| MAY 11 | 40.0 | 5.6 | 38.0 | 48.5 10 | 31.3 29 | 92 18 | 75.8 | 10.8 | 76.5 | 15 31 | 21.4 | 6.7 | 20.0 | MAY 11 |
| MAY 21 | 36.9 | 6.3 | 36.5 | 50.4 17 | 23.7 34 | 89 14 | 70.1 | 14.5 | 72.0 | 12 20 | 19.1 | 6.1 | 18.0 | MAY 21 |
| JUN 1 | 41.8 | 14.2 | 47.0 | 60.0 67 | 19.8 26 | 93 67 | 70.2 | 24.2 | 82.0 | 1 17 | 19.8 | 10.5 | 20.5 | JUN 1 |
| JUN 11 | 41.1 | 10.1 | 39.0 | 57.2 26 | 27.1 34 | 93 26 | 71.3 | 18.8 | 76.5 | 16 19 | 21.3 | 6.4 | 19.0 | JUN 11 |
| JUN 21 | 36.1 | 8.7 | 35.0 | 55.7 14 | 22.9 19 | 89 14 | 63.6 | 17.0 | 66.0 | 11 29 | 19.8 | 5.1 | 20.0 | JUN 21 |
| JUL 1 | 30.3 | 7.0 | 30.0 | 45.4 14 | 20.2 20 | 89 26 | 53.5 | 19.6 | 49.0 | 11 18 | 17.0 | 4.7 | 17.0 | JUL 1 |
| JUL 11 | 26.6 | 4.9 | 25.5 | 34.8 14 | 21.4 19 | 67 20 | 50.6 | 11.3 | 52.5 | 10 31 | 15.8 | 4.6 | 15.5 | JUL 11 |
| JUL 21 | 26.9 | 9.6 | 23.5 | 48.8 18 | 17.3 29 | 89 25 | 48.3 | 21.0 | 41.0 | 7 31 | 15.0 | 4.7 | 14.5 | JUL 21 |
| AUG 1 | 29.8 | 7.3 | 26.5 | 43.5 18 | 21.5 34 | 79 18 | 53.6 | 14.6 | 50.0 | 12 67 | 16.4 | 3.8 | 15.0 | AUG 1 |
| AUG 11 | 31.4 | 13.4 | 29.8 | 57.7 15 | 17.1 67 | 93 14 | 58.8 | 28.5 | 58.8 | 12 31 | 17.9 | 5.0 | 18.8 | AUG 11 |
| AUG 21 | 32.6 | 8.7 | 31.0 | 46.3 28 | 21.9 29 | 94 26 | 62.7 | 22.8 | 68.0 | 11 31 | 15.9 | 4.0 | 16.8 | AUG 21 |
| SEP 1 | 40.5 | 15.4 | 39.8 | 69.7 18 | 7.8 20 | 100 18 | 75.6 | 12.7 | 76.0 | 1 28 | 20.3 | 12.8 | 18.8 | SEP 1 |
| SEP 11 | 45.7 | 13.6 | 40.5 | 69.6 14 | 29.1 28 | 93 26 | 78.1 | 16.5 | 76.0 | 1 28 | 28.1 | 12.2 | 28.5 | SEP 11 |
| SEP 21 | 49.8 | 13.1 | 53.8 | 65.4 18 | 22.3 28 | 94 18 | 78.7 | 15.4 | 74.0 | 1 28 | 28.9 | 12.6 | 30.5 | SEP 21 |
| OCT 1 | 57.6 | 11.5 | 57.8 | 85.4 14 | 41.8 17 | 100 14 | 81.6 | 13.3 | 87.8 | 24 29 | 38.8 | 12.6 | 35.5 | OCT 1 |
| OCT 11 | 60.4 | 8.8 | 61.5 | 77.8 14 | 45.9 29 | 100 34 | 82.1 | 14.8 | 83.8 | 25 29 | 42.7 | 9.7 | 44.5 | OCT 11 |
| OCT 21 | 69.8 | 9.4 | 68.8 | 85.9 34 | 55.2 29 | 100 67 | 90.3 | 9.6 | 92.8 | 29 18 | 46.1 | 11.9 | 46.8 | OCT 21 |
| MONTH | | | | | | | | | | | | | | MONTH |
| MAY | 38.9 | 3.8 | 39.8 | 43.3 67 | 34.2 25 | 93 19 | 83.5 | 6.5 | 84.5 | 12 20 | 16.3 | 3.2 | 16.0 | MAY |
| JUN | 39.8 | 7.3 | 40.8 | 49.8 67 | 25.9 19 | 93 67 | 84.2 | 13.4 | 88.8 | 1 17 | 14.6 | 5.8 | 15.5 | JUN |
| JUL | 27.9 | 4.1 | 26.5 | 36.8 18 | 21.7 19 | 89 26 | 68.8 | 16.4 | 63.8 | 7 31 | 12.1 | 2.1 | 12.5 | JUL |
| AUG | 31.3 | 7.7 | 32.8 | 45.3 18 | 21.1 67 | 94 26 | 70.9 | 19.3 | 73.8 | 11 31 | 14.2 | 2.6 | 14.8 | AUG |
| SEP | 43.3 | 11.6 | 45.8 | 60.8 18 | 19.4 28 | 100 18 | 86.2 | 9.6 | 88.8 | 1 28 | 18.8 | 10.1 | 18.8 | SEP |
| OCT | 62.4 | 8.1 | 61.8 | 82.4 14 | 49.2 29 | 100 67 | 94.1 | 4.9 | 93.8 | 24 29 | 34.5 | 9.6 | 32.8 | OCT |

Table 9: 5 pm relative humidity summary table, Kalispell, 1910-67, selected years

POOR QUALITY

The following pages are scanned at the best possible quality setting. The original pages are of poor quality and this is the best possible reproduction.

FM1000 summary table, Kalispell, 1910-67 selected years

1910-1967

| 1910-1967 | | | | | | | | | | 1910-1967 | | | | | | | | | |
|-----------|------|-------|------|------|----|------|-------|-----|-------|-----------|------|-------|-------|------|-----|------|-------|-----|-----|
| MONTH | MEAN | STDEV | MIN | MAX | N | MEAN | STDEV | MIN | MAX | MONTH | MEAN | STDEV | MIN | MAX | N | MEAN | STDEV | MIN | MAX |
| MAY | 19.1 | 0.7 | 19.0 | 20.0 | 67 | 18.0 | 1.6 | I | 25 67 | 24.6 | 0.5 | 25.0 | 14 31 | 15.4 | 1.1 | 15.0 | | | MAY |
| JUN | 16.0 | 2.2 | 15.5 | 19.1 | 26 | 12.4 | 1.6 | I | 24 29 | 18.8 | 3.1 | 18.5 | 11 31 | 13.9 | 2.2 | 14.0 | | | JUN |
| JUL | 13.4 | 2.5 | 12.0 | 18.8 | 14 | 9.7 | 1.9 | I | 24 14 | 16.7 | 3.6 | 16.0 | 9 31 | 11.1 | 2.2 | 10.0 | | | JUL |
| AUG | 11.7 | 2.1 | 11.0 | 15.7 | 18 | 8.5 | 3.4 | I | 17 18 | 13.5 | 2.4 | 14.0 | 8 34 | 10.3 | 1.8 | 10.0 | | | AUG |
| SEP | 14.7 | 2.7 | 13.5 | 19.0 | 26 | 11.6 | 2.0 | I | 25 29 | 19.3 | 3.9 | 19.0 | 9 34 | 11.8 | 2.6 | 11.0 | | | SEP |
| OCT | 16.5 | 2.5 | 16.0 | 22.8 | 10 | 15.2 | 2.0 | I | 25 10 | 20.9 | 2.3 | 20.5 | 10 20 | 16.3 | 3.0 | 16.5 | | | OCT |
| MAY | 19.1 | 0.7 | 19.0 | 20.0 | 67 | 18.0 | 1.6 | I | 25 67 | 24.6 | 0.5 | 25.0 | 14 31 | 15.4 | 1.1 | 15.0 | | | MAY |
| JUN | 16.0 | 2.2 | 15.5 | 19.1 | 26 | 12.4 | 1.6 | I | 24 29 | 18.8 | 3.1 | 18.5 | 11 31 | 13.9 | 2.2 | 14.0 | | | JUN |
| JUL | 13.4 | 2.5 | 12.0 | 18.8 | 14 | 9.7 | 1.9 | I | 24 14 | 16.7 | 3.6 | 16.0 | 9 31 | 11.1 | 2.2 | 10.0 | | | JUL |
| AUG | 11.7 | 2.1 | 11.0 | 15.7 | 18 | 8.5 | 3.4 | I | 17 18 | 13.5 | 2.4 | 14.0 | 8 34 | 10.3 | 1.8 | 10.0 | | | AUG |
| SEP | 14.7 | 2.7 | 13.5 | 19.0 | 26 | 11.6 | 2.0 | I | 25 29 | 19.3 | 3.9 | 19.0 | 9 34 | 11.8 | 2.6 | 11.0 | | | SEP |
| OCT | 16.5 | 2.5 | 16.0 | 22.8 | 10 | 15.2 | 2.0 | I | 25 10 | 20.9 | 2.3 | 20.5 | 10 20 | 16.3 | 3.0 | 16.5 | | | OCT |

Table 10: FM1000 summary table, Kalispell, 1910-67 selected years

POOR QUALITY

The following pages are scanned at the best possible quality setting. The original pages are of poor quality and this is the best possible reproduction.

KALISPELL, CALIFORNIA

1910-1967

| 10-DAY AND MONTHLY EXTREMES | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | |
|-----------------------------|------|-----------|------|------|----------|-----------------------------|-------|-----------|-----------|-------------|-------|----------|-----------|------------|-------------|
| DATE | MEAN | STD. DEV. | MIN. | MAX. | AVG. YR. | NO. OF YRS. | HIGH | AVG. HIGH | STD. DEV. | MEDIAN HIGH | LOW | AVG. LOW | STD. DEV. | MEDIAN LOW | PRD. BEGINS |
| MAY 1 | 37.4 | 6.5 | 32.5 | 44.0 | 26 | 1 | 54 26 | 44.6 | 7.2 | 50.0 | 12 20 | 19.2 | 10.9 | 16.0 | MAY 1 |
| MAY 11 | 38.1 | 6.5 | 33.2 | 44.5 | 26 | 1 | 54 26 | 41.0 | 5.1 | 42.0 | 12 34 | 25.1 | 4.4 | 24.0 | MAY 11 |
| MAY 21 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | MAY 21 |
| JUN 1 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | JUN 1 |
| JUN 11 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | JUN 11 |
| JUN 21 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | JUN 21 |
| JUL 1 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | JUL 1 |
| JUL 11 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | JUL 11 |
| JUL 21 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | JUL 21 |
| AUG 1 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | AUG 1 |
| AUG 11 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | AUG 11 |
| AUG 21 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | AUG 21 |
| SEP 1 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | SEP 1 |
| SEP 11 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | SEP 11 |
| SEP 21 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | SEP 21 |
| OCT 1 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | OCT 1 |
| OCT 11 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | OCT 11 |
| OCT 21 | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 54 21 | 46.7 | 7.2 | 38.0 | 27 14 | 31.8 | 4.3 | 31.0 | OCT 21 |
| MONTH | MEAN | STD. DEV. | MIN. | MAX. | AVG. YR. | NO. OF YRS. | HIGH | AVG. HIGH | STD. DEV. | MEDIAN HIGH | LOW | AVG. LOW | STD. DEV. | MEDIAN LOW | MONTH |
| MAY | 34.7 | 6.5 | 32.5 | 44.0 | 26 | 1 | 54 31 | 47.2 | 7.2 | 50.0 | 12 20 | 19.7 | 10.6 | 17.0 | MAY |
| JUN | 40.6 | 9.1 | 40.5 | 40.5 | 31 | 1 | 66 19 | 50.7 | 8.6 | 49.0 | 17 67 | 28.0 | 10.4 | 23.5 | JUN |
| JUL | 52.8 | 9.4 | 54.5 | 69.5 | 19 | 1 | 81 31 | 65.5 | 11.0 | 67.0 | 19 14 | 36.3 | 9.2 | 36.5 | JUL |
| AUG | 56.6 | 10.4 | 55.5 | 72.4 | 34 | 1 | 80 29 | 67.1 | 9.7 | 66.0 | 25 26 | 41.5 | 13.6 | 35.5 | AUG |
| SEP | 36.7 | 15.2 | 36.0 | 66.0 | 20 | 1 | 81 20 | 50.3 | 22.6 | 52.0 | 13 10 | 26.0 | 10.4 | 23.0 | SEP |
| OCT | 26.3 | 6.6 | 26.5 | 35.7 | 29 | 1 | 59 20 | 36.7 | 10.1 | 37.0 | 6 14 | 15.9 | 5.1 | 17.5 | OCT |

Table 11: 1978 NFDRS ERC summary table, Kalispell, 1910-67, selected years

WIND SPEED - 5PM

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 244558 KALISPELL AIRPORT

1910-1967

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | |
|---------------------------------|------|------|--------|---------|--------|-----------------------------|---------|------|------|--------|--------|------|------|--------|--------|
| PRD. | MEAN | STD. | MEDIAN | HIGHEST | LOWEST | | | AUG. | STD. | MEDIAN | | AUG. | STD. | MEDIAN | PRD. |
| BEGINS | | DEV. | | AVG,YR | AVG,YR | | HIGH,YR | HIGH | DEV. | HIGH | LOW,YR | LOW | DEV. | LOW | BEGINS |
| MAY 1 | 8.6 | 1.9 | 8.0 | 12.6 67 | 5.6 14 | I | 17 67 | 13.7 | 2.3 | 14.0 | 2 20 | 4.1 | 1.8 | 4.0 | MAY 1 |
| MAY 11 | 8.5 | 2.3 | 8.0 | 13.2 67 | 4.7 14 | I | 20 20 | 14.8 | 3.5 | 15.5 | 0 34 | 3.1 | 2.2 | 3.5 | MAY 11 |
| MAY 21 | 8.3 | 1.5 | 8.0 | 11.0 67 | 6.3 25 | I | 24 19 | 14.7 | 3.9 | 14.0 | 0 17 | 2.9 | 1.3 | 3.0 | MAY 21 |
| JUN 1 | 8.7 | 1.9 | 7.5 | 12.3 67 | 6.6 29 | I | 25 20 | 16.0 | 4.5 | 15.0 | 0 10 | 3.4 | 1.9 | 3.5 | JUN 1 |
| JUN 11 | 7.3 | 1.3 | 6.5 | 10.0 34 | 5.3 17 | I | 20 31 | 12.8 | 3.6 | 12.0 | 0 31 | 2.8 | 1.8 | 2.5 | JUN 11 |
| JUN 21 | 8.7 | 2.0 | 8.0 | 13.2 67 | 5.6 14 | I | 23 17 | 16.2 | 4.3 | 16.5 | 0 10 | 3.3 | 1.8 | 3.0 | JUN 21 |
| JUL 1 | 8.6 | 2.1 | 8.0 | 12.7 67 | 5.0 26 | I | 22 29 | 15.3 | 4.3 | 14.5 | 2 29 | 3.3 | 1.5 | 4.0 | JUL 1 |
| JUL 11 | 8.0 | 1.9 | 7.5 | 12.3 26 | 5.7 31 | I | 20 26 | 15.5 | 3.3 | 16.0 | 0 10 | 2.8 | 1.5 | 3.0 | JUL 11 |
| JUL 21 | 8.1 | 1.9 | 7.5 | 11.5 67 | 5.5 25 | I | 55 18 | 18.8 | 12.6 | 15.5 | 1 18 | 3.2 | 1.3 | 3.0 | JUL 21 |
| AUG 1 | 7.1 | 1.4 | 6.0 | 9.8 67 | 4.6 10 | I | 20 67 | 14.5 | 3.8 | 13.5 | 0 19 | 2.3 | 1.3 | 2.0 | AUG 1 |
| AUG 11 | 6.3 | 2.2 | 6.0 | 10.4 67 | 3.4 14 | I | 24 34 | 12.7 | 5.0 | 12.5 | 0 31 | 2.6 | 2.0 | 2.0 | AUG 11 |
| AUG 21 | 6.6 | 1.5 | 6.0 | 9.5 67 | 4.8 14 | I | 21 67 | 13.8 | 3.4 | 13.0 | 0 20 | 2.0 | 1.3 | 2.0 | AUG 21 |
| SEP 1 | 6.3 | 2.3 | 5.0 | 11.1 67 | 3.3 19 | I | 17 67 | 11.6 | 3.5 | 12.0 | 0 67 | 2.1 | 1.6 | 2.5 | SEP 1 |
| SEP 11 | 5.8 | 2.1 | 5.0 | 10.7 67 | 3.0 17 | I | 17 67 | 10.1 | 3.6 | 8.5 | 0 29 | 1.9 | 1.6 | 1.5 | SEP 11 |
| SEP 21 | 5.6 | 2.2 | 5.5 | 10.9 67 | 3.3 18 | I | 18 67 | 12.4 | 3.9 | 11.0 | 1 29 | 1.8 | 1.2 | 1.5 | SEP 21 |
| OCT 1 | 5.1 | 1.4 | 4.5 | 8.8 67 | 3.2 10 | I | 31 14 | 13.3 | 7.0 | 11.0 | 0 34 | 1.3 | 1.4 | 1.0 | OCT 1 |
| OCT 11 | 4.6 | 2.0 | 3.5 | 8.8 34 | 1.9 14 | I | 22 34 | 11.1 | 5.9 | 9.0 | 0 19 | 1.4 | 0.9 | 1.5 | OCT 11 |
| OCT 21 | 4.2 | 1.8 | 3.5 | 9.3 67 | 2.1 14 | I | 16 18 | 9.7 | 3.9 | 8.0 | 0 34 | 1.2 | 1.0 | 1.0 | OCT 21 |
| 7TH | | | | | | I | | | | | | | | | Nov 1H |
| MAY | 8.5 | 1.6 | 8.0 | 12.2 67 | 6.2 14 | I | 24 19 | 16.5 | 3.3 | 16.5 | 0 34 | 1.8 | 1.2 | 2.0 | MAY |
| JUN | 8.2 | 1.3 | 8.0 | 11.4 67 | 6.4 10 | I | 25 20 | 19.2 | 3.2 | 19.0 | 0 31 | 1.9 | 1.1 | 2.0 | JUN |
| JUL | 8.2 | 1.2 | 7.5 | 11.1 67 | 6.7 10 | I | 55 18 | 23.0 | 10.7 | 20.0 | 0 10 | 2.1 | 1.0 | 2.0 | JUL |
| AUG | 6.7 | 1.4 | 6.0 | 9.9 67 | 4.7 10 | I | 24 34 | 16.9 | 4.0 | 17.0 | 0 31 | 1.3 | 1.1 | 1.0 | AUG |
| SEP | 5.9 | 2.0 | 5.5 | 10.9 67 | 3.7 17 | I | 18 67 | 13.5 | 3.7 | 14.0 | 0 67 | 0.8 | 0.6 | 1.0 | SEP |
| OCT | 4.6 | 1.4 | 4.0 | 8.4 67 | 2.9 14 | I | 31 14 | 15.8 | 7.3 | 14.0 | 0 34 | 0.6 | 1.0 | 0.0 | OCT |

Table 12: 5 pm wind speed, Kalispell, 1910-67, selected years

P R E C I P I T A T I O N

BY 10 (OR 11)-DAY AND MONTHLY PERIODS

STATION NUMBER 245690

MILES CITY

YRS 1910-1934

| PERIOD BEGINS | NO. YRS | MEAN TOTAL | 10-DAY AND MONTHLY TOTALS | | | I EXTREME | | | MAXIMUM DAILY TOTALS | | | | | |
|------------------|------------|---------------|---------------------------|-----------------|----------------|--------------|-----------|------------|----------------------|------------|----|-------|-------|-------|
| | | | STD, DEV | HIGHEST TOT. | LOWEST TOT. | I TOT. | I TOT. | AUE DAY | STD DEV | STD DEV | | | | |
| MAY 1 | 11 | 0.375 | 0.480 | 0.260 | 1.69 | 19 | 0.00 | 17 | 1 | 0.43 | 19 | 0.183 | 0.151 | 0.100 |
| MAY 11 | 11 | 0.355 | 0.338 | 0.280 | 0.93 | 10 | 0.00 | 19 | 1 | 0.67 | 10 | 0.260 | 0.248 | 0.220 |
| MAY 21 | 11 | 0.652 | 0.660 | 0.340 | 1.69 | 29 | 0.00 | 34 | 1 | 1.05 | 26 | 0.472 | 0.409 | 0.340 |
| JUN 1 | 11 | 0.509 | 0.717 | 0.340 | 2.37 | 29 | 0.00 | 26 | 1 | 1.20 | 29 | 0.385 | 0.411 | 0.200 |
| JUN 11 | 11 | 0.730 | 0.678 | 0.490 | 1.31 | 20 | 0.00 | 17 | 1 | 0.72 | 20 | 0.362 | 0.242 | 0.300 |
| JUN 21 | 11 | 0.603 | 0.605 | 0.490 | 2.09 | 14 | 0.00 | 19 | 1 | 1.10 | 14 | 0.347 | 0.342 | 0.370 |
| JUL 1 | 11 | 0.550 | 0.335 | 0.230 | 1.00 | 20 | 0.00 | 18 | 1 | 0.73 | 19 | 0.270 | 0.279 | 0.130 |
| JUL 11 | 11 | 0.548 | 0.547 | 0.120 | 1.47 | 20 | 0.00 | 17 | 1 | 1.19 | 20 | 0.221 | 0.355 | 0.100 |
| JUL 21 | 11 | 0.331 | 0.257 | 0.240 | 0.60 | 18 | 0.00 | 26 | 1 | 0.62 | 34 | 0.264 | 0.207 | 0.190 |
| AUG 1 | 11 | 0.254 | 0.320 | 0.170 | 1.15 | 25 | 0.00 | 34 | 1 | 1.00 | 25 | 0.183 | 0.286 | 0.080 |
| AUG 11 | 11 | 0.454 | 0.661 | 0.060 | 1.84 | 14 | 0.00 | 31 | 1 | 0.85 | 14 | 0.255 | 0.333 | 0.060 |
| AUG 21 | 11 | 0.260 | 0.254 | 0.240 | 0.65 | 10 | 0.00 | 26 | 1 | 0.65 | 10 | 0.223 | 0.230 | 0.200 |
| SEP 1 | 11 | 0.136 | 0.122 | 0.090 | 0.37 | 19 | 0.00 | 17 | 1 | 0.14 | 19 | 0.063 | 0.046 | 0.050 |
| SEP 11 | 11 | 0.208 | 0.230 | 0.100 | 0.66 | 19 | 0.00 | 17 | 1 | 0.48 | 19 | 0.147 | 0.153 | 0.080 |
| SEP 21 | 11 | 0.683 | 0.539 | 0.510 | 1.71 | 29 | 0.00 | 17 | 1 | 1.10 | 29 | 0.445 | 0.319 | 0.400 |
| OCT 1 | 11 | 0.286 | 0.454 | 0.100 | 1.53 | 14 | 0.00 | 34 | 1 | 0.82 | 14 | 0.183 | 0.247 | 0.080 |
| OCT 11 | 11 | 0.174 | 0.189 | 0.060 | 0.46 | 19 | 0.00 | 31 | 1 | 0.43 | 14 | 0.134 | 0.152 | 0.060 |
| OCT 21 | 11 | 0.314 | 0.405 | 0.190 | 1.37 | 19 | 0.00 | 14 | 1 | 0.78 | 19 | 0.164 | 0.226 | 0.100 |

MONTH

| MAY | 11 | 1.411 | 0.622 | 1.490 | 2.29 | 17 | 0.34 | 34 | 1 | 1.05 | 26 | 0.650 | 0.253 | 0.670 |
|-----|----|-------|-------|-------|------|----|------|----|---|------|----|-------|-------|-------|
| JUN | 10 | 1.939 | 1.119 | 2.180 | 3.44 | 14 | 0.46 | 19 | 1 | 1.20 | 29 | 0.616 | 0.386 | 0.530 |
| JUL | 11 | 1.029 | 0.725 | 0.760 | 2.66 | 20 | 0.41 | 26 | 1 | 1.19 | 20 | 0.505 | 0.298 | 0.550 |
| AUG | 11 | 0.967 | 0.748 | 0.590 | 2.51 | 14 | 0.17 | 31 | 1 | 1.00 | 25 | 0.470 | 0.310 | 0.350 |
| SEP | 11 | 1.027 | 0.611 | 1.040 | 1.94 | 10 | 0.00 | 17 | 1 | 1.18 | 29 | 0.469 | 0.310 | 0.440 |
| OCT | 11 | 0.774 | 0.777 | 0.480 | 2.47 | 19 | 0.03 | 34 | 1 | 0.82 | 14 | 0.293 | 0.271 | 0.200 |

STOP

LARRY -END OF TASK CODE= 0 CPUTIME=9.668/1.448

*

Table 13: Precipitation summary table, Miles City, 1910-34
selected years

POOR QUALITY

The following pages are scanned at the best possible quality setting. The original pages are of poor quality and this is the best possible reproduction.

MAXIMUM DAILY TEMPERATURE

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 243690

MILES CITY AIRPORT

1910-1934

10-DAY AND MONTHLY PERIOD MEANS

10-DAY AND MONTHLY EXTREME DAILY VALUES

| PERIOD | NO. OF DAYS | MEAN | STD. DEV. | MEDIAN | HIGHEST AVG. YR. | LOWEST AVG. YR. | HIGH, YR. | LOW, YR. | Avg. HIGH | STD. DEV. HIGH | MEDIAN HIGH | LOW, YR. | Avg. LOW | STD. DEV. LOW | MEDIAN LOW | PERIOD |
|-----------|-------------|------|-----------|--------|------------------|-----------------|-----------|----------|-----------|----------------|-------------|----------|----------|---------------|------------|--------|
| MAY 1-11 | 11 | 65.2 | 6.2 | 60.0 | 67.9 34 | 55.3 29 | 94 34 | 79.5 | 9.4 | 80.0 | 42 19 | 51.1 | 5.0 | 51.0 | MAY 1 | |
| MAY 11-21 | 11 | 71.2 | 4.1 | 70.0 | 69.1 34 | 67.2 20 | 95 34 | 86.5 | 5.4 | 84.0 | 42 14 | 55.5 | 7.2 | 54.0 | MAY 11 | |
| MAY 21-31 | 11 | 74.8 | 7.6 | 74.0 | 84.9 19 | 62.0 17 | 101 34 | 89.5 | 6.1 | 90.0 | 41 18 | 58.1 | 6.0 | 60.0 | MAY 21 | |
| JUN 1-11 | 11 | 75.5 | 5.0 | 75.0 | 81.7 14 | 66.0 25 | 102 10 | 92.2 | 6.1 | 94.0 | 50 10 | 60.4 | 6.9 | 60.0 | JUN 1 | |
| JUN 11-21 | 11 | 81.3 | 7.2 | 80.0 | 91.8 16 | 66.9 26 M | 108 10 | 96.5 | 8.4 | 97.0 | 57 26 | 68.5 | 7.4 | 68.0 | JUN 11 | |
| JUN 21-31 | 11 | 85.2 | 6.3 | 85.0 | 99.1 19 | 78.1 14 | 107 19 | 96.9 | 7.3 | 97.0 | 61 14 | 74.3 | 8.3 | 76.0 | JUN 21 | |
| JUL 1-11 | 11 | 86.6 | 3.6 | 85.0 | 92.5 14 | 80.5 31 | 105 17 | 99.4 | 4.2 | 100.0 | 65 29 | 73.0 | 5.6 | 75.0 | JUL 1 | |
| JUL 11-21 | 11 | 92.1 | 2.8 | 91.0 | 96.0 34 | 85.6 18 | 108 10 | 101.9 | 3.8 | 100.0 | 72 18 | 79.1 | 3.6 | 79.0 | JUL 11 | |
| JUL 21-31 | 11 | 90.9 | 4.9 | 92.0 | 95.7 29 | 80.2 25 | 107 31 | 102.4 | 4.9 | 100.0 | 58 18 | 75.5 | 3.6 | 78.0 | JUL 21 | |
| AUG 1-11 | 11 | 86.7 | 4.6 | 86.0 | 93.1 20 | 80.1 31 | 107 34 | 97.2 | 3.8 | 96.0 | 65 17 | 76.6 | 8.2 | 76.0 | AUG 1 | |
| AUG 11-21 | 11 | 87.5 | 5.0 | 89.0 | 93.3 31 | 76.4 26 | 106 10 | 96.9 | 6.2 | 98.0 | 66 26 | 75.4 | 5.6 | 75.0 | AUG 11 | |
| AUG 21-31 | 11 | 84.1 | 5.1 | 85.0 | 93.8 29 | 76.6 34 | 105 26 | 97.5 | 4.1 | 97.0 | 59 14 | 69.3 | 8.5 | 68.0 | AUG 21 | |
| SEP 1-11 | 11 | 75.3 | 5.8 | 76.0 | 87.6 31 | 67.9 29 | 100 29 | 89.4 | 6.7 | 88.0 | 54 29 | 61.5 | 6.5 | 62.0 | SEP 1 | |
| SEP 11-21 | 11 | 75.3 | 5.3 | 74.0 | 86.0 20 | 66.6 26 | 97 14 | 90.4 | 5.5 | 91.0 | 44 34 | 58.7 | 10.4 | 59.0 | SEP 11 | |
| SEP 21-31 | 11 | 66.2 | 7.7 | 67.0 | 78.4 14 | 54.3 34 | 94 18 | 85.5 | 5.3 | 87.0 | 32 26 | 49.3 | 10.6 | 49.0 | SEP 21 | |
| OCT 1-11 | 11 | 67.2 | 7.9 | 68.0 | 78.9 20 | 50.4 25 | 91 20 | 80.6 | 7.2 | 81.0 | 34 25 | 52.1 | 11.2 | 50.0 | OCT 1 | |
| OCT 11-21 | 11 | 61.9 | 8.6 | 65.0 | 70.7 18 | 45.5 25 | 86 34 | 75.5 | 9.4 | 78.0 | 31 25 | 46.4 | 9.2 | 50.0 | OCT 11 | |
| OCT 21-31 | 11 | 51.6 | 10.2 | 55.0 | 62.3 14 M | 30.8 19 M | 77 26 | 67.7 | 7.1 | 70.0 | 13 25 | 36.9 | 12.8 | 42.0 | OCT 21 | |
| MONTH | | | | | | | | | | | | | | | | MONTH |
| MAY | 11 | 70.5 | 4.4 | 70.0 | 81.4 34 | 65.5 29 | 101 34 | 91.9 | 4.7 | 92.0 | 41 18 | 47.8 | 5.1 | 47.0 | MAY | |
| JUN | 11 | 81.1 | 3.9 | 81.0 | 88.2 19 | 76.3 25 | 108 10 | 100.3 | 6.0 | 98.0 | 50 10 | 58.8 | 5.0 | 60.0 | JUN | |
| JUL | 11 | 89.9 | 2.6 | 90.0 | 93.3 14 | 85.0 18 | 108 10 | 104.6 | 2.2 | 100.0 | 58 18 | 70.6 | 6.7 | 74.0 | JUL | |
| AUG | 11 | 86.0 | 2.6 | 85.0 | 90.6 29 | 82.5 26 | 107 34 | 101.2 | 3.9 | 100.0 | 59 14 | 67.1 | 5.8 | 67.0 | AUG | |
| SEP | 11 | 72.3 | 4.3 | 71.0 | 77.5 14 | 66.2 29 | 100 29 | 94.8 | 3.8 | 95.0 | 32 26 | 48.6 | 10.0 | 49.0 | SEP | |
| OCT | 11 | 60.2 | 8.0 | 63.0 | 67.3 10 M | 44.2 25 M | 91 20 | 81.3 | 6.6 | 81.0 | 13 25 | 36.2 | 12.2 | 42.0 | OCT | |

Table 14: Maximum daily temperature summary table, Miles City, 1910-34, selected years.

POOR QUALITY

The following pages are scanned at the best possible quality setting. The original pages are of poor quality and this is the best possible reproduction.

RELATIVE HUMIDITY

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 247599

MILES CITY AIRPORT

1910-1934

10-DAY AND MONTHLY PERIOD MEANS

10-DAY AND MONTHLY EXTREME DAILY VALUES

| PRD. | NO. | MEAN | STD. | MEDIAN | HIGHEST | LOWEST | HIGH, YR | AUG. | STD. | MEDIAN | LOW, YR | AUG. | STD. | MEDIAN | PRD. |
|--------|-------|------|------|--------|-----------|-----------|----------|------|------|--------|---------|------|------|--------|--------|
| BEGINS | YR | | DEV. | | AVG, YR | AVG, YR | | HIGH | DEV. | HIGH | | LOW | DEV. | LOW | BEGINS |
| MAY | 1 11 | 44.5 | 11.1 | 44.0 | 75.4 19 | 22.4 34 | 93 20 | 77.3 | 17.4 | 81.0 | 15 34 | 23.9 | 12.3 | 21.0 | MAY 1 |
| MAY | 11 11 | 37.2 | 11.1 | 37.0 | 55.9 10 | 19.7 34 | 100 30 | 73.8 | 22.6 | 77.0 | 8 31 | 22.0 | 7.3 | 22.0 | MAY 11 |
| MAY | 21 11 | 41.2 | 11.1 | 39.0 | 65.5 17 | 20.9 34 | 94 25 | 73.7 | 17.6 | 83.0 | 11 34 | 21.2 | 3.3 | 20.0 | MAY 21 |
| JUN | 1 11 | 46.4 | 13.1 | 43.0 | 66.2 29 | 27.3 26 | 94 31 | 74.9 | 20.2 | 75.0 | 12 19 | 24.4 | 12.2 | 24.0 | JUN 1 |
| JUN | 11 11 | 41.0 | 12.1 | 42.0 | 61.3 20 | 21.5 31 | 89 20 | 68.9 | 19.8 | 77.0 | 5 34 | 19.5 | 7.4 | 16.0 | JUN 11 |
| JUN | 21 11 | 37.3 | 10.1 | 38.0 | 57.5 20 | 22.1 34 | 90 10 | 66.9 | 17.3 | 64.0 | 12 19 | 22.3 | 11.2 | 18.0 | JUN 21 |
| JUL | 1 11 | 36.9 | 7.1 | 37.0 | 48.2 20 | 19.3 34 | 100 31 | 65.4 | 16.9 | 62.0 | 7 34 | 19.2 | 5.7 | 21.0 | JUL 1 |
| JUL | 11 11 | 36.9 | 10.1 | 37.0 | 50.2 20 | 15.7 34 | 82 14 | 54.0 | 19.4 | 47.0 | 11 34 | 18.7 | 3.0 | 19.0 | JUL 11 |
| JUL | 21 11 | 32.0 | 8.1 | 33.0 | 45.1 10 | 22.7 29 | 90 25 | 68.9 | 18.7 | 74.0 | 9 34 | 16.0 | 5.8 | 15.0 | JUL 21 |
| AUG | 1 11 | 34.6 | 7.1 | 37.0 | 47.0 18 | 21.9 34 | 85 25 | 61.4 | 15.4 | 57.0 | 12 31 | 16.7 | 4.3 | 16.0 | AUG 1 |
| AUG | 11 11 | 30.7 | 14.7 | 38.0 | 74.2 10 | 20.5 29 | 100 10 | 63.1 | 20.2 | 57.0 | 11 29 | 21.3 | 7.1 | 21.0 | AUG 11 |
| AUG | 21 11 | 42.0 | 21.4 | 37.0 | 100.0 10 | 22.9 31 | 100 10 | 62.2 | 21.4 | 61.0 | 12 31 | 26.3 | 25.5 | 17.0 | AUG 21 |
| SEP | 1 11 | 46.8 | 12.3 | 53.0 | 63.3 19 | 24.6 31 | 100 25 | 72.8 | 19.0 | 79.0 | 16 31 | 29.4 | 9.2 | 32.0 | SEP 1 |
| SEP | 11 11 | 45.2 | 9.2 | 44.0 | 58.5 17 | 33.0 31 | 93 14 | 76.0 | 14.5 | 81.0 | 5 34 | 26.2 | 3.7 | 26.0 | SEP 11 |
| SEP | 21 11 | 56.6 | 9.1 | 54.0 | 69.0 29 | 43.6 26 | 100 25 | 85.1 | 12.3 | 90.0 | 14 26 | 32.4 | 12.2 | 31.0 | SEP 21 |
| OCT | 1 11 | 52.2 | 12.0 | 54.0 | 69.0 14 | 29.5 34 | 93 14 | 73.6 | 16.4 | 77.0 | 19 34 | 34.9 | 9.7 | 34.0 | OCT 1 |
| OCT | 11 11 | 57.3 | 13.2 | 62.0 | 79.9 19 | 37.5 31 | 100 19 | 77.8 | 12.8 | 78.0 | 19 34 | 39.6 | 12.9 | 45.0 | OCT 11 |
| OCT | 21 11 | 61.3 | 13.9 | 64.0 | 84.1 19 M | 39.4 34 M | 100 29 | 82.1 | 14.9 | 84.0 | 10 31 | 39.9 | 19.3 | 45.0 | OCT 21 |
| MONTH | | | | | | | | | | | | | | | |
| MAY | 11 | 41.6 | 10.7 | 42.0 | 54.4 20 | 20.7 34 | 100 20 | 88.5 | 16.0 | 92.0 | 8 31 | 17.0 | 5.2 | 16.0 | MAY |
| JUN | 11 | 40.9 | 7.7 | 42.0 | 54.0 20 | 31.6 34 | 94 31 | 85.8 | 9.5 | 89.0 | 5 34 | 16.0 | 7.0 | 16.0 | JUN |
| JUL | 11 | 33.5 | 6.3 | 32.0 | 44.8 20 | 21.6 34 | 100 31 | 79.3 | 11.2 | 81.0 | 7 34 | 14.7 | 5.7 | 13.0 | JUL |
| AUG | 11 | 38.5 | 12.2 | 37.0 | 69.4 10 | 25.0 29 | 100 10 | 73.0 | 16.4 | 73.0 | 11 29 | 15.5 | 4.7 | 13.0 | AUG |
| SEP | 11 | 49.6 | 8.0 | 48.0 | 60.5 18 | 35.5 31 | 100 25 | 91.2 | 4.2 | 92.0 | 5 34 | 23.8 | 9.6 | 25.0 | SEP |
| OCT | 11 | 57.0 | 11.5 | 56.0 | 74.4 19 M | 39.0 34 M | 100 29 | 88.5 | 9.1 | 87.0 | 10 31 | 31.2 | 12.4 | 38.0 | OCT |

Table 15. 5 pm relative humidity, Miles City, 1910-34, selected years

POOR QUALITY

The following pages are scanned at the best possible quality setting. The original pages are of poor quality and this is the best possible reproduction.

1978 NFORS 1000 HOUR FM

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 245690 MILES CITY AIRPORT

1910-1934

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | |
|---------------------------------|------|-----------|--------|-----------------|----------------|-----------------------------|-----------|-----------|-------------|--------|----------|-----------|------------|---------------|--|
| PERIOD BEGINS | MEAN | STD. DEV. | MEDIAN | HIGHEST AVG. YR | LOWEST AVG. YR | HIGH YR | AVG. HIGH | STD. DEV. | MEDIAN HIGH | LOW YR | AVG. LOW | STD. DEV. | MEDIAN LOW | PERIOD BEGINS | |
| MAY 1 | 14.7 | 1.0 | 14.0 | 16.8 19 | 13.6 34 | 13 19 | 15.4 | 0.9 | 15.0 | 12 34 | 13.9 | 1.1 | 14.0 | MAY 1 | |
| MAY 11 | 14.4 | 1.9 | 14.0 | 17.4 19 | 11.2 34 | 16 19 | 14.8 | 1.7 | 15.0 | 10 34 | 13.8 | 2.0 | 14.0 | MAY 11 | |
| MAY 21 | 13.4 | 2.1 | 14.0 | 15.7 18 | 9.5 34 | 17 18 | 14.1 | 2.3 | 15.0 | 9 34 | 12.7 | 2.1 | 14.0 | MAY 21 | |
| JUN 1 | 13.4 | 2.1 | 14.0 | 16.7 17 | 9.5 34 | 17 17 | 14.2 | 2.1 | 15.0 | 9 34 | 12.7 | 2.0 | 13.0 | JUN 1 | |
| JUN 11 | 13.5 | 2.1 | 13.5 | 17.0 17 | 10.0 34 | 17 17 | 14.1 | 2.2 | 14.5 | 10 34 | 12.9 | 2.2 | 13.0 | JUN 11 | |
| JUN 21 | 12.8 | 2.1 | 12.0 | 16.0 20 | 9.1 34 | 16 20 | 13.5 | 2.1 | 14.0 | 9 34 | 12.4 | 2.1 | 12.0 | JUN 21 | |
| JUL 1 | 12.3 | 2.1 | 12.0 | 15.7 20 | 8.6 34 | 16 20 | 12.7 | 2.1 | 12.0 | 8 34 | 11.6 | 2.1 | 12.0 | JUL 1 | |
| JUL 11 | 11.6 | 2.2 | 11.0 | 16.2 20 | 7.9 34 | 17 20 | 12.1 | 2.5 | 12.0 | 7 34 | 10.8 | 2.3 | 10.0 | JUL 11 | |
| JUL 21 | 10.8 | 1.9 | 10.0 | 14.7 20 | 8.4 34 | 16 20 | 11.3 | 2.1 | 11.0 | 8 34 | 10.2 | 1.9 | 10.0 | JUL 21 | |
| AUG 1 | 10.5 | 1.5 | 10.0 | 13.1 20 | 8.0 34 | 14 20 | 10.9 | 1.8 | 10.0 | 8 34 | 10.0 | 1.3 | 10.0 | AUG 1 | |
| AUG 11 | 11.0 | 1.6 | 11.0 | 13.1 17 | 8.0 34 | 14 17 | 11.6 | 1.8 | 12.0 | 8 34 | 10.5 | 1.6 | 10.0 | AUG 11 | |
| AUG 21 | 11.3 | 2.0 | 11.0 | 14.0 14 | 8.1 29 | 14 18 | 11.9 | 1.9 | 12.0 | 8 34 | 10.8 | 2.1 | 11.0 | AUG 21 | |
| SEP 1 | 12.2 | 2.3 | 13.0 | 14.7 14 | 8.5 29 | 15 18 | 12.7 | 2.4 | 14.0 | 8 29 | 11.6 | 2.2 | 12.0 | SEP 1 | |
| SEP 11 | 13.1 | 2.4 | 14.0 | 15.6 17 | 9.1 31 | 16 18 | 13.4 | 2.4 | 14.0 | 9 34 | 12.6 | 2.5 | 14.0 | SEP 11 | |
| SEP 21 | 14.4 | 1.7 | 14.0 | 16.6 18 | 11.4 31 | 17 25 | 15.1 | 1.7 | 15.0 | 10 31 | 13.6 | 2.2 | 14.0 | SEP 21 | |
| OCT 1 | 15.1 | 1.8 | 15.0 | 17.2 25 | 12.3 31 | 18 25 | 15.5 | 1.9 | 16.0 | 12 34 | 14.7 | 1.8 | 15.0 | OCT 1 | |
| OCT 11 | 15.6 | 1.8 | 16.0 | 18.0 14 | 12.3 34 | 18 25 | 16.0 | 1.8 | 16.0 | 12 34 | 15.2 | 1.9 | 16.0 | OCT 11 | |
| OCT 21 | 16.1 | 2.2 | 16.0 | 18.8 19 | 12.6 34 | 19 19 | 16.5 | 2.1 | 17.0 | 12 34 | 15.5 | 2.1 | 16.0 | OCT 21 | |
| MONTH | | | | | | MONTH | | | | | | | | | |
| MAY | 14.3 | 1.7 | 14.0 | 17.0 17 | 11.4 34 | 18 19 | 15.8 | 1.0 | 15.5 | 9 34 | 12.9 | 2.2 | 13.5 | MAY | |
| JUN | 13.4 | 2.0 | 13.0 | 16.7 17 | 9.5 34 | 17 17 | 14.6 | 2.2 | 15.5 | 9 34 | 12.2 | 1.9 | 12.5 | JUN | |
| JUL | 11.5 | 2.0 | 11.0 | 15.5 20 | 8.3 34 | 17 20 | 13.0 | 2.3 | 13.0 | 7 34 | 10.0 | 1.9 | 10.0 | JUL | |
| AUG | 11.0 | 1.5 | 10.0 | 13.1 18 | 8.3 34 | 14 20 | 12.3 | 1.8 | 13.0 | 8 34 | 9.6 | 1.3 | 9.0 | AUG | |
| SEP | 13.2 | 2.1 | 13.0 | 15.4 18 | 9.8 31 | 17 25 | 15.1 | 1.7 | 15.0 | 8 29 | 11.5 | 2.3 | 12.0 | SEP | |
| OCT | 15.6 | 1.9 | 16.0 | 17.6 14 | 12.4 34 | 19 19 | 16.5 | 2.1 | 17.0 | 12 34 | 14.7 | 1.8 | 15.0 | OCT | |

Table 16: FM1000, Miles City, 1910-34, selected years
Climate zone 1 initial values (15%)

POOR QUALITY

The following pages are scanned at the best possible quality setting. The original pages are of poor quality and this is the best possible reproduction.

1978 NFDRS ERC (G/3)

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 245602 MILES CITY AIRPORT

1910-1934

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | |
|---------------------------------|------|-----------|--------|-----------------|----------------|-----------------------------|-----------|-----------|-------------|---------|----------|-----------|------------|---------------|--|
| PERIOD | MEAN | STD. DEV. | MEDIAN | HIGHEST AVG. YR | LOWEST AVG. YR | HIGH. YR | AVG. HIGH | STD. DEV. | MEDIAN HIGH | LOW. YR | AVG. LOW | STD. DEV. | MEDIAN LOW | PERIOD BEGINS | |
| MAY 1 | 44.0 | 7.9 | 43.0 | 55.3 34 | 20.5 19 | 61 34 | 58.4 | 8.5 | 54.0 | 25 19 | 34.4 | 6.3 | 35.0 | MAY 1 | |
| MAY 11 | 45.1 | 10.2 | 44.0 | 64.2 34 | 30.0 17 | 69 31 | 58.3 | 11.6 | 58.5 | 27 20 | 37.7 | 10.1 | 35.0 | MAY 11 | |
| MAY 21 | 49.2 | 11.5 | 47.0 | 71.7 34 | 34.2 18 | 77 34 | 58.5 | 11.5 | 58.0 | 25 18 | 39.5 | 10.7 | 38.0 | MAY 21 | |
| JUN 1 | 46.0 | 10.4 | 44.0 | 60.0 34 | 29.1 17 | 72 34 | 52.3 | 12.1 | 59.0 | 25 17 | 39.2 | 9.0 | 39.0 | JUN 1 | |
| JUN 11 | 45.6 | 11.4 | 42.0 | 64.7 31 | 26.0 17 | 73 31 | 52.7 | 12.8 | 49.0 | 26 17 | 38.8 | 11.2 | 37.0 | JUN 11 | |
| JUN 21 | 50.5 | 11.5 | 50.0 | 70.8 34 | 32.5 20 | 73 34 | 58.5 | 12.2 | 59.0 | 29 20 | 43.9 | 11.4 | 44.0 | JUN 21 | |
| JUL 1 | 52.3 | 9.9 | 52.0 | 74.0 34 | 37.0 20 | 79 34 | 58.3 | 10.8 | 58.0 | 31 20 | 45.7 | 10.3 | 44.0 | JUL 1 | |
| JUL 11 | 57.5 | 12.5 | 58.0 | 79.9 34 | 38.3 20 | 83 34 | 63.2 | 11.9 | 67.0 | 30 20 | 51.0 | 13.0 | 50.0 | JUL 11 | |
| JUL 21 | 60.6 | 9.3 | 65.0 | 72.1 34 | 43.7 20 | 80 34 | 66.6 | 10.4 | 67.0 | 36 18 | 51.1 | 8.3 | 51.0 | JUL 21 | |
| AUG 1 | 60.0 | 8.9 | 60.0 | 76.2 34 | 49.5 16 | 82 34 | 66.5 | 8.1 | 67.0 | 42 20 | 52.9 | 8.3 | 53.0 | AUG 1 | |
| AUG 11 | 55.8 | 10.2 | 53.0 | 73.0 34 | 43.5 17 | 78 34 | 62.1 | 10.5 | 62.0 | 37 26 | 48.4 | 10.7 | 46.0 | AUG 11 | |
| AUG 21 | 54.2 | 13.0 | 54.0 | 74.0 29 | 36.3 10 | 78 29 | 60.0 | 13.9 | 66.0 | 35 10 | 47.9 | 12.0 | 44.0 | AUG 21 | |
| SEP 1 | 48.8 | 12.9 | 40.0 | 71.7 31 | 36.3 17 | 76 31 | 55.4 | 13.6 | 53.0 | 32 19 | 43.0 | 11.6 | 39.0 | SEP 1 | |
| SEP 11 | 45.6 | 11.0 | 42.0 | 65.4 31 | 32.6 17 | 73 31 | 50.5 | 13.6 | 46.0 | 28 17 | 39.8 | 11.0 | 37.0 | SEP 11 | |
| SEP 21 | 37.6 | 6.4 | 37.0 | 47.9 31 | 29.2 10 | 56 29 | 44.5 | 8.7 | 43.0 | 22 25 | 31.5 | 5.1 | 32.0 | SEP 21 | |
| OCT 1 | 37.7 | 8.8 | 36.0 | 54.9 34 | 26.9 25 | 60 34 | 42.4 | 9.7 | 40.0 | 23 14 | 32.8 | 7.9 | 31.0 | OCT 1 | |
| OCT 11 | 34.9 | 8.3 | 32.0 | 49.7 34 | 25.4 14 | 61 34 | 39.6 | 10.3 | 34.0 | 21 19 | 29.8 | 6.6 | 30.0 | OCT 11 | |
| OCT 21 | 33.7 | 9.9 | 31.0 | 50.3 34 | 21.0 19 | 57 34 | 38.9 | 12.2 | 36.0 | 20 19 | 29.0 | 7.8 | 27.0 | OCT 21 | |
| MONTH | | | | | | MONTH | | | | | | | | | |
| MAY | 45.3 | 9.9 | 41.5 | 64.3 34 | 30.0 17 | 77 34 | 56.8 | 12.1 | 56.0 | 25 19 | 33.0 | 7.3 | 31.5 | MAY | |
| JUN | 46.8 | 10.3 | 43.5 | 64.8 34 | 28.8 17 | 73 34 | 57.3 | 12.1 | 58.0 | 26 17 | 34.8 | 6.8 | 32.5 | JUN | |
| JUL | 56.9 | 9.8 | 58.0 | 75.2 34 | 38.2 20 | 83 34 | 67.7 | 10.2 | 69.0 | 30 20 | 43.4 | 8.1 | 43.0 | JUL | |
| AUG | 56.6 | 9.4 | 54.0 | 72.5 34 | 45.5 17 | 82 34 | 69.4 | 7.9 | 68.0 | 35 18 | 43.8 | 8.1 | 40.0 | AUG | |
| SEP | 44.0 | 9.8 | 41.0 | 61.7 31 | 33.9 18 | 76 31 | 56.1 | 14.0 | 53.0 | 22 25 | 30.8 | 5.1 | 30.0 | SEP | |
| OCT | 35.4 | 8.8 | 32.0 | 51.6 34 | 26.8 14 | 61 34 | 43.2 | 10.0 | 40.0 | 20 19 | 27.5 | 6.2 | 27.0 | OCT | |

Table 17: 1978 NFDRS ERC (G/3), Miles City, 1910-34, selected years,
Climate zone 1 initial FM1000 values (15%)

STATION NUMBER 245690 MILES CITY AIRPORT

1910-1934

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | | DATE | |
|---------------------------------|------|------|---------|---------|---------|---|-----------------------------|------|--------|------|---------|------|--------|------|--------|--|------|--|
| PRD. | STD. | | HIGHEST | LOWEST | | | AVG. | STD. | MEDIAN | | AVG. | STD. | MEDIAN | PRD. | | | | |
| BEGINS | MEAN | DEV. | MEDIAN | AVG, YR | AVG, YR | | HIGH, YR | HIGH | DEV. | HIGH | LOW, YR | LOW | DEV. | LOW | BEGINS | | | |
| MAY 1 | 8.3 | 1.3 | 8.0 | 10.4 31 | 5.9 29 | 1 | 22 14 | 15.6 | 3.9 | 15.0 | 1 29 | 3.2 | 1.2 | 3.0 | MAY 1 | | | |
| MAY 11 | 8.8 | 3.0 | 7.5 | 16.0 17 | 5.6 14 | 1 | 20 19 | 16.1 | 3.3 | 15.5 | 0 29 | 3.8 | 4.2 | 3.0 | MAY 11 | | | |
| MAY 21 | 7.5 | 1.2 | 7.0 | 10.3 25 | 5.8 31 | 1 | 25 25 | 16.1 | 4.6 | 15.0 | 1 31 | 2.4 | 1.4 | 2.0 | MAY 21 | | | |
| JUN 1 | 8.8 | 2.2 | 9.0 | 11.7 34 | 4.6 31 | 1 | 30 34 | 19.3 | 6.7 | 20.0 | 0 31 | 2.4 | 1.4 | 2.0 | JUN 1 | | | |
| JUN 11 | 7.9 | 1.4 | 7.0 | 10.1 25 | 5.8 29 | 1 | 24 25 | 16.0 | 4.1 | 15.5 | 0 29 | 2.9 | 2.4 | 3.0 | JUN 11 | | | |
| JUN 21 | 8.5 | 1.5 | 8.0 | 11.0 19 | 6.0 29 | 1 | 27 10 | 17.0 | 4.8 | 15.0 | 0 31 | 3.0 | 2.0 | 3.0 | JUN 21 | | | |
| JUL 1 | 7.7 | 1.7 | 7.0 | 10.3 19 | 5.1 14 | 1 | 24 19 | 16.3 | 4.8 | 17.0 | 0 19 | 1.8 | 1.3 | 2.0 | JUL 1 | | | |
| JUL 11 | 6.8 | 1.8 | 6.0 | 10.6 14 | 5.2 31 | 1 | 30 19 | 14.5 | 7.9 | 11.0 | 0 29 | 2.4 | 1.0 | 2.0 | JUL 11 | | | |
| JUL 21 | 6.9 | 1.2 | 6.0 | 8.9 34 | 5.1 26 | 1 | 30 18 | 15.2 | 5.7 | 14.0 | 0 31 | 1.8 | 1.5 | 1.0 | JUL 21 | | | |
| AUG 1 | 7.6 | 1.3 | 7.0 | 9.2 19 | 4.7 25 | 1 | 20 19 | 15.1 | 4.5 | 13.0 | 1 31 | 2.7 | 1.4 | 3.0 | AUG 1 | | | |
| AUG 11 | 6.4 | 2.4 | 5.0 | 11.6 18 | 3.1 10 | 1 | 30 18 | 15.9 | 6.7 | 12.0 | 0 31 | 1.5 | 1.4 | 1.0 | AUG 11 | | | |
| AUG 21 | 5.3 | 2.4 | 5.0 | 7.9 34 | 0.0 10 | 1 | 20 20 | 13.4 | 5.5 | 13.0 | 0 31 | 1.4 | 1.1 | 1.0 | AUG 21 | | | |
| SEP 1 | 6.6 | 1.5 | 6.0 | 9.9 17 | 4.3 29 | 1 | 20 31 | 13.8 | 3.7 | 12.0 | 0 29 | 1.6 | 1.0 | 1.0 | SEP 1 | | | |
| SEP 11 | 6.1 | 1.6 | 6.0 | 9.2 25 | 3.0 10 | 1 | 20 25 | 13.6 | 5.9 | 12.0 | 0 31 | 1.6 | 1.3 | 1.0 | SEP 11 | | | |
| SEP 21 | 4.9 | 1.9 | 5.0 | 7.7 26 | 2.0 10 | 1 | 21 26 | 11.3 | 5.8 | 11.0 | 0 31 | 1.1 | 0.8 | 1.0 | SEP 21 | | | |
| OCT 1 | 5.1 | 1.9 | 4.0 | 8.8 20 | 2.3 29 | 1 | 36 20 | 14.3 | 8.8 | 11.0 | 0 34 | 1.0 | 0.9 | 1.0 | OCT 1 | | | |
| OCT 11 | 4.1 | 1.7 | 3.0 | 7.9 17 | 1.9 29 | 1 | 27 17 | 11.4 | 6.5 | 10.0 | 0 34 | 0.8 | 0.6 | 1.0 | OCT 11 | | | |
| OCT 21 | 5.9 | 1.8 | 5.0 | 9.0 17 | 3.7 14 | 1 | 26 31 | 14.4 | 6.0 | 13.0 | 0 31 | 1.4 | 0.9 | 1.0 | OCT 21 | | | |
| MONTH | | | | | | 1 | | | | | | | | | MONTH | | | |
| MAY | 8.6 | 2.5 | 8.0 | 16.0 17 | 5.9 29 | 1 | 25 25 | 19.1 | 3.1 | 19.5 | 0 29 | 2.9 | 4.2 | 2.0 | MAY | | | |
| JUN | 8.3 | 1.2 | 8.0 | 9.4 19 | 6.4 31 | 1 | 30 34 | 21.8 | 5.7 | 22.5 | 0 31 | 1.8 | 1.0 | 2.0 | JUN | | | |
| JUL | 7.1 | 0.9 | 7.0 | 8.7 19 | 5.8 29 | 1 | 30 19 | 21.0 | 6.4 | 20.0 | 0 31 | 1.2 | 1.2 | 1.0 | JUL | | | |
| AUG | 6.4 | 1.6 | 6.0 | 8.9 18 | 3.1 10 | 1 | 30 18 | 19.5 | 4.9 | 20.0 | 0 31 | 1.1 | 0.9 | 1.0 | AUG | | | |
| SEP | 5.9 | 1.2 | 6.0 | 8.2 17 | 4.0 10 | 1 | 20 25 | 17.5 | 4.8 | 15.0 | 0 31 | 1.0 | 0.6 | 1.0 | SEP | | | |
| OCT | 5.0 | 1.6 | 5.0 | 8.4 17 | 2.7 29 | 1 | 36 20 | 18.4 | 7.9 | 15.0 | 0 34 | 0.7 | 0.6 | 1.0 | OCT | | | |

Table 18: 5 pm wind speed, Miles City, 1910-34, selected years

STATION NUMBER 245690 MILES CITY AIRPORT

1955-1977

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | |
|---------------------------------|------|------|--------|---------|---------|---------|------|------|------|-----------------------------|-----|------|------|--------|------|--|--|--|--|
| | | | | | | | | | | | | | | | | | | | |
| PRD. | | STD. | | HIGHEST | LOWEST | | | AVG. | STD. | MEDIAN | | AVG. | STD. | MEDIAN | PRD. | | | | |
| BEGINS | MEAN | DEV. | MEDIAN | AVG,YR | AVG,YR | HIGH,YR | HIGH | DEV. | HIGH | LOW,YR | LOW | DEV. | LOW | BEGINS | | | | | |
| MAY 1 | 13.2 | 1.7 | 13.0 | 16.5 64 | 10.2 66 | 34 55 | 23.4 | 4.8 | 23.0 | 0 74 | 4.6 | 3.6 | 5.0 | MAY | | | | | |
| MAY 11 | 12.3 | 2.1 | 12.0 | 16.5 74 | 7.3 61 | 32 74 | 22.4 | 3.6 | 23.0 | 0 73 | 4.0 | 3.3 | 5.0 | MAY 11 | | | | | |
| MAY 21 | 11.9 | 2.6 | 12.0 | 16.1 61 | 5.9 63 | 28 77 | 21.2 | 4.1 | 23.0 | 0 68 | 3.0 | 2.9 | 4.0 | MAY 21 | | | | | |
| JUN 1 | 11.7 | 2.4 | 11.0 | 15.9 75 | 8.0 66 | 34 61 | 20.7 | 4.6 | 20.0 | 0 76 | 4.3 | 3.9 | 4.0 | JUN 1 | | | | | |
| JUN 11 | 11.6 | 2.2 | 11.0 | 17.3 73 | 7.0 67 | 40 60 | 20.7 | 5.0 | 19.0 | 0 69 | 3.2 | 2.6 | 4.0 | JUN 11 | | | | | |
| JUN 21 | 11.6 | 2.6 | 11.0 | 17.0 76 | 6.2 67 | 34 55 | 21.3 | 5.6 | 23.0 | 0 66 | 4.0 | 2.9 | 4.0 | JUN 21 | | | | | |
| JUL 1 | 10.9 | 1.9 | 10.0 | 14.3 69 | 6.9 67 | 43 69 | 21.3 | 6.6 | 20.0 | 0 74 | 2.5 | 2.6 | 2.0 | JUL 1 | | | | | |
| JUL 11 | 11.2 | 2.4 | 11.0 | 14.6 73 | 6.7 59 | 34 76 | 20.6 | 6.1 | 21.0 | 0 71 | 3.3 | 2.6 | 5.0 | JUL 11 | | | | | |
| JUL 21 | 10.4 | 2.3 | 10.0 | 15.3 77 | 5.7 67 | 34 69 | 20.5 | 6.2 | 19.0 | 0 76 | 3.1 | 3.0 | 4.0 | JUL 21 | | | | | |
| AUG 1 | 10.9 | 2.2 | 10.0 | 16.1 75 | 7.6 66 | 36 70 | 21.3 | 5.3 | 20.0 | 0 74 | 3.3 | 2.9 | 5.0 | AUG 1 | | | | | |
| AUG 11 | 10.8 | 1.7 | 10.0 | 15.0 74 | 8.6 65 | 32 68 | 20.8 | 5.3 | 20.0 | 0 74 | 3.3 | 2.0 | 4.0 | AUG 11 | | | | | |
| AUG 21 | 11.0 | 1.4 | 11.0 | 14.5 64 | 8.2 67 | 28 76 | 21.3 | 3.8 | 21.0 | 0 76 | 3.0 | 2.5 | 4.0 | AUG 21 | | | | | |
| SEP 1 | 10.2 | 1.9 | 10.0 | 13.4 75 | 6.3 63 | 27 76 | 19.3 | 5.0 | 20.0 | 0 70 | 2.7 | 2.6 | 3.0 | SEP 1 | | | | | |
| SEP 11 | 10.9 | 2.6 | 10.0 | 17.7 71 | 7.0 66 | 46 71 | 21.1 | 6.8 | 19.0 | 0 76 | 2.8 | 2.7 | 4.0 | SEP 11 | | | | | |
| SEP 21 | 10.4 | 1.9 | 10.0 | 14.7 58 | 6.2 63 | 23 75 | 19.7 | 2.9 | 20.0 | 0 76 | 2.4 | 3.0 | 0.0 | SEP 21 | | | | | |
| OCT 1 | 10.5 | 1.7 | 10.0 | 14.3 69 | 6.0 63 | 28 58 | 21.0 | 4.5 | 20.0 | 0 75 | 1.6 | 2.4 | 0.0 | OCT 1 | | | | | |
| OCT 11 | 8.6 | 1.5 | 8.0 | 11.4 58 | 5.9 62 | 48 58 | 17.7 | 7.5 | 17.0 | 0 77 | 2.7 | 2.3 | 4.0 | OCT 11 | | | | | |
| OCT 21 | 9.3 | 2.0 | 9.0 | 12.0 61 | 4.1 65 | 34 56 | 20.3 | 6.2 | 20.0 | 0 77 | 2.6 | 2.3 | 3.0 | OCT 21 | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| MONTH | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| Y | 12.4 | 1.3 | 12.0 | 15.3 68 | 9.9 63 | 34 55 | 26.0 | 4.1 | 25.0 | 0 74 | 1.4 | 2.3 | 0.0 | MAY | | | | | |
| JUN | 11.7 | 1.6 | 11.0 | 14.4 73 | 7.5 67 | 40 60 | 25.4 | 5.2 | 23.0 | 0 76 | 1.4 | 2.0 | 0.0 | JUN | | | | | |
| JUL | 10.8 | 1.7 | 11.0 | 13.9 77 | 6.5 67 | 43 69 | 25.8 | 6.6 | 25.0 | 0 76 | 1.0 | 1.9 | 0.0 | JUL | | | | | |
| AUG | 10.9 | 1.3 | 11.0 | 13.6 75 | 8.5 67 | 36 70 | 25.2 | 4.6 | 23.0 | 0 76 | 1.0 | 1.8 | 0.0 | AUG | | | | | |
| SEP | 10.5 | 1.5 | 10.0 | 12.8 75 | 7.6 66 | 46 71 | 24.0 | 5.8 | 23.0 | 0 76 | 1.0 | 1.8 | 0.0 | SEP | | | | | |
| OCT | 9.5 | 1.1 | 9.0 | 11.2 66 | 6.6 65 | 48 58 | 25.1 | 6.2 | 25.0 | 0 77 | 0.7 | 1.6 | 0.0 | OCT | | | | | |

Table 18a: 5 pm wind speed, Miles City, 1955-77, all years

PRECIPITATION

BY 10 (OR 11)-DAY AND MONTHLY PERIODS

STATION NUMBER 249999 YELLOWSTONE PARK YRS 1910-1934

| PERIOD BEGINS | NO. YRS | MEAN TOTAL | 10-DAY AND MONTHLY TOTALS | | | | I TOT, YR | I TOT, YR | I TOT, YR | MAXIMUM DAILY TOTALS | | | |
|------------------|------------|---------------|---------------------------|--------|--------------------|-------------------|--------------|--------------|--------------|----------------------|------------|------------|--------|
| | | | STD DEV | MEDIAN | HIGHEST TOT, YR | LOWEST TOT, YR | | | | EXTREME YR | AVG MAX | STD DEV | MEDIAN |
| MAY 1 | 10 | 0.679 | 0.386 | 0.705 | 1.35 29 | 0.12 14 | I | I | I | 0.65 29 | 0.348 | 0.180 | 0.340 |
| MAY 11 | 10 | 0.453 | 0.479 | 0.195 | 1.17 25 | 0.00 17 | I | I | I | 0.70 25 | 0.255 | 0.237 | 0.190 |
| MAY 21 | 10 | 0.644 | 0.570 | 0.425 | 1.73 20 | 0.02 34 | I | I | I | 0.69 20 | 0.269 | 0.210 | 0.230 |
| JUN 1 | 10 | 0.630 | 0.508 | 0.520 | 1.63 34 | 0.03 26 | I | I | I | 1.05 34 | 0.311 | 0.300 | 0.245 |
| JUN 11 | 10 | 0.557 | 0.508 | 0.475 | 1.43 34 | 0.01 19 | I | I | I | 0.77 34 | 0.272 | 0.252 | 0.235 |
| JUN 21 | 10 | 0.323 | 0.406 | 0.285 | 1.34 25 | 0.00 19 | I | I | I | 0.64 26 | 0.155 | 0.159 | 0.130 |
| JUL 1 | 10 | 0.096 | 0.048 | 0.085 | 0.19 14 | 0.02 19 | I | I | I | 0.09 29 | 0.059 | 0.018 | 0.060 |
| JUL 11 | 10 | 0.278 | 0.344 | 0.175 | 1.03 29 | 0.01 31 | I | I | I | 0.47 29 | 0.145 | 0.164 | 0.095 |
| JUL 21 | 10 | 0.416 | 0.324 | 0.405 | 0.90 10 | 0.03 14 | I | I | I | 0.44 10 | 0.196 | 0.146 | 0.200 |
| AUG 1 | 10 | 0.364 | 0.215 | 0.370 | 0.63 20 | 0.02 31 | I | I | I | 0.36 25 | 0.187 | 0.110 | 0.190 |
| AUG 11 | 10 | 0.247 | 0.301 | 0.130 | 0.78 25 | 0.00 19 | I | I | I | 0.65 25 | 0.180 | 0.227 | 0.130 |
| AUG 21 | 10 | 0.256 | 0.311 | 0.175 | 1.06 29 | 0.01 19 | I | I | I | 0.57 29 | 0.173 | 0.183 | 0.105 |
| SEP 1 | 10 | 0.446 | 0.429 | 0.250 | 1.24 19 | 0.01 31 | I | I | I | 0.57 20 | 0.233 | 0.198 | 0.160 |
| SEP 11 | 10 | 0.449 | 0.575 | 0.235 | 1.84 14 | 0.00 34 | I | I | I | 0.53 14 | 0.186 | 0.174 | 0.120 |
| SEP 21 | 10 | 0.661 | 0.415 | 0.800 | 1.17 25 | 0.08 14 | I | I | I | 0.66 19 | 0.353 | 0.204 | 0.360 |
| OCT 1 | 10 | 0.547 | 0.373 | 0.570 | 1.12 26 | 0.02 34 | I | I | I | 0.68 26 | 0.309 | 0.207 | 0.280 |
| OCT 11 | 10 | 0.486 | 0.341 | 0.585 | 0.95 25 | 0.00 31 | I | I | I | 0.55 20 | 0.226 | 0.165 | 0.255 |
| OCT 21 | 10 | 0.618 | 0.562 | 0.555 | 1.96 19 | 0.00 14 | I | I | I | 1.11 19 | 0.313 | 0.319 | 0.230 |

| MONTH | | | | | | | | | | | | | |
|-------|----|-------|-------|-------|---------|---------|---|---|---|---------|-------|-------|-------|
| MAY | 10 | 1.776 | 0.706 | 1.805 | 2.84 20 | 0.42 34 | I | I | I | 0.70 25 | 0.502 | 0.163 | 0.495 |
| JUN | 9 | 1.537 | 1.129 | 1.180 | 3.48 34 | 0.14 19 | I | I | I | 1.05 34 | 0.380 | 0.295 | 0.290 |
| JUL | 10 | 0.790 | 0.451 | 0.760 | 1.72 10 | 0.18 26 | I | I | I | 0.47 29 | 0.254 | 0.140 | 0.205 |
| AUG | 10 | 0.867 | 0.466 | 0.605 | 1.65 25 | 0.20 14 | I | I | I | 0.65 25 | 0.345 | 0.179 | 0.325 |
| SEP | 10 | 1.556 | 0.732 | 1.370 | 2.73 25 | 0.62 26 | I | I | I | 0.66 19 | 0.454 | 0.154 | 0.505 |
| OCT | 10 | 1.651 | 0.634 | 1.450 | 2.69 19 | 0.78 31 | I | I | I | 1.11 19 | 0.506 | 0.253 | 0.445 |

Table 19: Precipitation summary table, Yellowstone Park
1910-34, selected years

MAXIMUM DAILY TEMPERATURE

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 249999 YELLOWSTONE PARK

1910-1934

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | | PRD. |
|---------------------------------|------|------|--------|-------------------|------------------|-----------------------------|--------------|--------------|----------------|--------|-------------|--------------|---------------|---------|--|-------|
| PERD. | MEAN | DEV. | MEDIAN | HIGHEST AVG.YR | LOWEST AVG.YR | HIGH.YR | AVG. HIGH | STD. DEV. | MEDIAN HIGH | LOW.YR | AVG. LOW | STD. DEV. | MEDIAN LOW | REGIONS | | |
| MAY 1 | 59.1 | 6.4 | 57.0 | 67.1 34 | 45.0 29 | 77 34 | 65.2 | 6.9 | 65.0 | 35 29 | 41.7 | 6.6 | 41.0 | MAY 1 | | |
| MAY 11 | 60.6 | 4.0 | 60.0 | 67.3 34 | 53.9 10 | 77 19 | 71.1 | 4.2 | 72.0 | 32 10 | 44.4 | 6.5 | 43.5 | MAY 11 | | |
| MAY 21 | 63.3 | 6.6 | 64.0 | 74.2 34 | 49.9 17 | 84 19 | 74.5 | 7.8 | 76.0 | 37 17 | 48.1 | 9.7 | 47.5 | MAY 21 | | |
| JUN 1 | 63.1 | 5.3 | 62.5 | 74.0 26 | 55.4 17 | 81 26 | 74.6 | 4.5 | 73.5 | 41 17 | 50.2 | 7.1 | 50.0 | JUN 1 | | |
| JUN 11 | 60.8 | 5.8 | 67.0 | 80.0 31 | 60.3 26 | 85 19 | 78.4 | 4.4 | 79.0 | 44 17 | 57.1 | 10.1 | 54.0 | JUN 11 | | |
| JUN 21 | 71.1 | 9.3 | 72.0 | 84.5 19 | 46.0 26 | 88 19 | 78.4 | 9.6 | 80.5 | 39 26 | 62.8 | 10.0 | 63.0 | JUN 21 | | |
| JUL 1 | 75.6 | 2.4 | 74.0 | 81.4 19 | 72.0 29 | 91 19 | 83.0 | 3.6 | 81.5 | 58 29 | 66.3 | 4.4 | 66.0 | JUL 1 | | |
| JUL 11 | 80.5 | 1.9 | 80.0 | 82.9 25 | 77.2 14 | 90 25 | 86.4 | 2.0 | 86.5 | 68 26 | 71.6 | 3.4 | 71.0 | JUL 11 | | |
| JUL 21 | 79.4 | 2.4 | 79.0 | 82.6 31 | 74.5 25 | 92 31 | 86.2 | 3.3 | 86.0 | 67 19 | 70.0 | 2.4 | 69.5 | JUL 21 | | |
| AUG 1 | 76.5 | 2.7 | 76.0 | 81.3 34 | 72.5 19 | 86 34 | 83.7 | 1.8 | 83.5 | 60 17 | 67.4 | 4.3 | 67.5 | AUG 1 | | |
| AUG 11 | 75.5 | 4.3 | 76.0 | 81.7 29 | 68.8 17 | 87 31 | 82.7 | 4.6 | 84.0 | 59 26 | 65.0 | 5.1 | 64.5 | AUG 11 | | |
| AUG 21 | 74.0 | 4.0 | 72.5 | 80.6 19 | 69.3 20 | 88 19 | 83.1 | 3.1 | 83.0 | 45 10 | 60.4 | 9.6 | 61.5 | AUG 21 | | |
| SEP 1 | 65.3 | 6.6 | 66.0 | 76.4 31 | 51.9 29 | 83 31 | 76.0 | 4.9 | 76.5 | 41 29 | 53.9 | 7.5 | 54.5 | SEP 1 | | |
| SEP 11 | 65.0 | 4.7 | 65.0 | 72.0 29 | 56.3 14 | 79 20 | 74.6 | 4.0 | 75.0 | 38 14 | 51.5 | 8.0 | 53.0 | SEP 11 | | |
| SEP 21 | 56.3 | 6.6 | 56.0 | 65.0 14 | 43.7 34 | 79 17 | 70.4 | 4.3 | 71.0 | 23 34 | 40.6 | 9.4 | 41.5 | SEP 21 | | |
| OCT 1 | 56.0 | 6.0 | 56.5 | 65.6 34 | 45.8 14 | 75 10 | 67.4 | 5.0 | 66.0 | 30 19 | 41.8 | 6.1 | 42.0 | OCT 1 | | |
| OCT 11 | 53.3 | 7.7 | 54.5 | 62.1 31 | 41.0 25 | 75 34 | 63.2 | 8.5 | 66.5 | 30 25 | 43.1 | 9.1 | 40.0 | OCT 11 | | |
| OCT 21 | 45.9 | 8.5 | 45.5 | 58.2 14 | 28.6 19 | 64 14 | 57.8 | 6.0 | 59.5 | 15 25 | 31.1 | 10.6 | 33.5 | OCT 21 | | |
| MONTH | | | | | | MONTH | | | | | | | | | | MONTH |
| MAY | 59.5 | 4.5 | 59.5 | 69.7 34 | 52.9 17 | 84 19 | 76.0 | 5.0 | 76.0 | 32 10 | 38.6 | 3.8 | 39.0 | MAY | | |
| JUN | 66.1 | 7.5 | 66.0 | 75.2 19 | 46.0 26 | 88 19 | 80.0 | 9.5 | 83.0 | 39 26 | 47.5 | 4.6 | 49.0 | JUN | | |
| JUL | 78.5 | 1.4 | 77.5 | 81.0 19 | 77.0 14 | 92 31 | 88.0 | 2.5 | 87.5 | 58 29 | 65.6 | 3.7 | 66.0 | JUL | | |
| AUG | 75.3 | 2.8 | 74.5 | 79.8 29 | 71.2 17 | 88 19 | 85.2 | 2.0 | 85.5 | 45 10 | 58.8 | 8.1 | 60.0 | AUG | | |
| SEP | 62.2 | 2.7 | 63.0 | 65.7 31 | 57.7 26 | 83 31 | 78.5 | 3.4 | 79.0 | 23 34 | 38.5 | 7.8 | 39.5 | SEP | | |
| OCT | 51.5 | 5.6 | 53.0 | 57.5 34 | 40.5 19 | 75 34 | 68.9 | 4.1 | 68.0 | 15 25 | 29.7 | 8.5 | 33.5 | OCT | | |

Table 20: Maximum daily temperature summary table, Yellowstone Park, 1910-34, selected years

POOR QUALITY

The following pages are scanned at the best possible quality setting. The original pages are of poor quality and this is the best possible reproduction.

RELATIVE HUMIDITY 5 P.M.

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

STATION NUMBER 249999 YELLOWSTONE

1910-1934

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | |
|---------------------------------|------|----------------|--------|--------------------|-------------------|---------|-----------------------------|--------------|----------------|--------|-------------|--------------|---------------|----------------|
| PRO. BEGINS | MEAN | STDEV. DEV. | MEDIAN | HIGHEST AVG. 10 | HIGHEST PERIOD | HIGH.YR | AVG. HIGH | STD. DEV. | MEDIAN HIGH | LOW.YR | AVG. LOW | STD. DEV. | MEDIAN LOW | PRO. BEGINS |
| MAY 1 | 48.0 | 8.1 | 48.5 | 54.7 17 | 35.1 17 | 100 19 | 67.7 | 7.5 | 45.0 | 11 34 | 22.1 | 7.8 | 18.0 | MAY 1 |
| MAY 11 | 47.5 | 10.1 | 39.0 | 50.6 14 | 25.8 34 | 100 20 | 57.4 | 10.0 | 31.0 | 14 07 | 20.0 | 4.7 | 20.5 | MAY 11 |
| MAY 21 | 44.2 | 10.1 | 42.0 | 73.7 17 | 26.2 34 | 100 17 | 58.2 | 17.2 | 11.5 | 17 34 | 22.9 | 6.2 | 20.5 | MAY 21 |
| JUN 1 | 43.0 | 11.0 | 46.0 | 56.6 25 | 28.3 21 | 100 34 | 72.7 | 22.5 | 66.0 | 15 28 | 23.5 | 7.0 | 21.0 | JUN 1 |
| JUN 11 | 49.1 | 10.1 | 40.0 | 51.7 26 | 22.4 19 | 92 28 | 67.1 | 20.8 | 75.5 | 14 10 | 19.4 | 4.4 | 18.5 | JUN 11 |
| JUN 21 | 43.0 | 11.6 | 32.5 | 48.1 25 | 14.1 19 | 89 28 | 57.0 | 22.7 | 61.5 | 9 19 | 19.2 | 6.9 | 19.0 | JUN 21 |
| JUL 1 | 34.9 | 9.1 | 35.0 | 50.5 26 | 10.8 19 | 74 26 | 61.2 | 10.5 | 42.5 | 10 34 | 18.2 | 5.5 | 19.0 | JUL 1 |
| JUL 11 | 32.1 | 9.1 | 32.0 | 45.5 20 | 18.4 31 | 89 28 | 60.9 | 18.1 | 54.0 | 10 31 | 15.5 | 4.1 | 16.5 | JUL 11 |
| JUL 21 | 30.8 | 6.0 | 33.0 | 43.0 31 | 23.5 26 | 90 28 | 66.1 | 16.0 | 63.5 | 11 29 | 16.4 | 4.9 | 14.5 | JUL 21 |
| AUG 1 | 38.9 | 10.0 | 41.5 | 53.1 25 | 23.7 31 | 89 25 | 69.2 | 17.3 | 70.0 | 11 10 | 19.1 | 6.3 | 19.0 | AUG 1 |
| AUG 11 | 32.6 | 10.0 | 30.0 | 47.9 26 | 21.6 29 | 93 26 | 68.4 | 19.3 | 66.0 | 10 29 | 17.4 | 6.2 | 16.5 | AUG 11 |
| AUG 21 | 33.1 | 8.4 | 34.0 | 43.6 26 | 24.5 31 | 89 34 | 67.4 | 12.4 | 63.5 | 11 19 | 16.3 | 5.0 | 15.0 | AUG 21 |
| SEP 1 | 45.1 | 12.3 | 51.5 | 61.6 26 | 25.2 31 | 100 17 | 73.0 | 15.2 | 76.0 | 11 10 | 20.5 | 6.6 | 18.5 | SEP 1 |
| SEP 11 | 44.8 | 12.8 | 43.0 | 66.2 14 | 26.4 34 | 93 17 | 73.9 | 13.6 | 74.5 | 11 34 | 21.4 | 6.8 | 20.0 | SEP 11 |
| SEP 21 | 54.5 | 8.7 | 54.5 | 66.1 34 | 40.5 10 | 100 34 | 86.6 | 8.4 | 87.5 | 17 19 | 25.6 | 5.7 | 26.0 | SEP 21 |
| OCT 1 | 53.6 | 12.2 | 49.5 | 73.9 14 | 39.9 10 | 92 25 | 80.7 | 7.6 | 80.0 | 19 31 | 32.8 | 11.8 | 29.5 | OCT 1 |
| OCT 11 | 57.9 | 14.3 | 58.0 | 76.2 25 | 32.0 31 | 100 20 | 82.1 | 17.7 | 86.5 | 19 31 | 36.5 | 13.6 | 33.5 | OCT 11 |
| OCT 21 | 62.0 | 13.8 | 61.0 | 87.3 19 | 41.8 10 | 100 25 | 85.4 | 12.6 | 87.0 | 23 10 | 41.7 | 12.7 | 41.0 | OCT 21 |
| MONTH | | | | | | | | | | | | | | MONTH |
| MAY | 44.5 | 6.9 | 46.0 | 52.5 17 | 29.0 34 | 100 20 | 91.2 | 7.3 | 91.5 | 11 34 | 17.0 | 3.5 | 17.5 | MAY |
| JUN | 38.4 | 8.7 | 39.5 | 49.0 25 | 22.1 19 | 100 34 | 80.5 | 17.7 | 87.0 | 9 19 | 16.1 | 4.7 | 15.0 | JUN |
| JUL | 33.6 | 4.4 | 34.0 | 38.8 14 | 25.8 19 | 90 29 | 75.0 | 10.0 | 75.5 | 10 34 | 13.6 | 3.9 | 12.5 | JUL |
| AUG | 34.8 | 7.6 | 31.0 | 46.2 26 | 27.3 31 | 93 26 | 76.4 | 12.5 | 74.5 | 10 28 | 14.8 | 4.7 | 12.5 | AUG |
| SEP | 48.2 | 5.9 | 47.5 | 57.9 25 | 40.6 31 | 100 34 | 89.3 | 7.5 | 91.0 | 11 34 | 17.6 | 4.8 | 17.5 | SEP |
| OCT | 57.8 | 9.8 | 62.0 | 71.0 25 | 44.0 29 | 100 25 | 91.5 | 8.3 | 91.5 | 19 31 | 28.3 | 7.4 | 29.5 | OCT |

Table 21: 5 pm relative humidity, Yellowstone Park, 1910-34, selected years

POOR QUALITY

The following pages are scanned at the best possible quality setting. The original pages are of poor quality and this is the best possible reproduction.

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

| STATION 1000 - YELLOWSTONE PARK, WYOMING | | | | | | | | | | | | | | | |
|--|------|----------|------|-----------------|----------------|---|-------|------|-----|------|-------|------|-----|------|--------|
| 1910-1934 | | | | | | | | | | | | | | | |
| MONTHLY MEANS | | | | | | | | | | | | | | | |
| END. BEGINS | MEAN | ST. DEV. | LOW | HIGHEST AVE. YR | LOWEST AVE. YR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| MAY 1 | 23.2 | 0.8 | 23.0 | 24.3 29 | 22.6 25 | 1 | 26.20 | 24.7 | 0.8 | 24.5 | 20 34 | 21.9 | 1.2 | 22.0 | MAY 1 |
| MAY 11 | 20.6 | 1.6 | 20.0 | 23.2 10 | 16.5 34 | 1 | 24 29 | 22.3 | 1.6 | 22.0 | 16 34 | 18.0 | 1.5 | 19.0 | MAY 11 |
| MAY 21 | 20.4 | 2.1 | 19.0 | 21.1 10 | 14.0 34 | 1 | 22 10 | 19.4 | 2.3 | 20.5 | 13 34 | 19.3 | 2.0 | 17.5 | MAY 21 |
| JUN 1 | 17.3 | 1.9 | 17.0 | 19.6 25 | 14.2 34 | 1 | 21 17 | 18.5 | 1.6 | 19.0 | 12 34 | 16.4 | 2.2 | 17.0 | JUN 1 |
| JUN 11 | 16.5 | 1.4 | 16.0 | 19.1 25 | 13.2 19 | 1 | 20 25 | 17.9 | 1.4 | 18.0 | 12 19 | 15.4 | 1.6 | 15.5 | JUN 11 |
| JUN 21 | 15.1 | 2.8 | 15.0 | 15.3 25 | 10.1 19 | 1 | 20 25 | 16.5 | 2.4 | 16.0 | 9 19 | 14.2 | 2.4 | 15.0 | JUN 21 |
| JUL 1 | 13.9 | 2.8 | 14.0 | 18.3 25 | 8.6 15 | 1 | 19 25 | 14.5 | 2.0 | 14.0 | 8 19 | 13.2 | 2.4 | 13.5 | JUL 1 |
| JUL 11 | 12.8 | 2.5 | 12.5 | 15.4 25 | 8.6 19 | 1 | 17 25 | 13.9 | 2.5 | 14.0 | 8 19 | 12.1 | 2.4 | 12.5 | JUL 11 |
| JUL 21 | 12.4 | 2.1 | 12.5 | 16.4 25 | 8.6 19 | 1 | 17 25 | 13.4 | 1.9 | 12.5 | 8 19 | 11.5 | 2.2 | 11.5 | JUL 21 |
| AUG 1 | 12.9 | 1.6 | 12.0 | 16.9 25 | 11.2 31 | 1 | 17 25 | 12.7 | 1.6 | 12.5 | 10 31 | 12.1 | 1.7 | 11.5 | AUG 1 |
| AUG 11 | 12.9 | 2.3 | 11.1 | 16.0 25 | 10.2 31 | 1 | 19 25 | 13.7 | 2.3 | 13.0 | 10 34 | 12.2 | 2.1 | 11.5 | AUG 11 |
| AUG 21 | 11.5 | 2.4 | 11.0 | 16.5 25 | 9.7 19 | 1 | 17 26 | 13.1 | 2.6 | 12.5 | 9 19 | 11.9 | 2.4 | 11.0 | AUG 21 |
| SEP 1 | 10.4 | 2.4 | 12.0 | 16.0 25 | 10.5 31 | 1 | 16 25 | 14.4 | 2.8 | 14.5 | 10 31 | 12.5 | 2.2 | 12.0 | SEP 1 |
| SEP 11 | 14.4 | 2.4 | 14.0 | 18.5 25 | 10.3 31 | 1 | 20 25 | 15.0 | 2.8 | 14.0 | 10 34 | 13.5 | 2.8 | 13.0 | SEP 11 |
| SEP 21 | 16.1 | 2.3 | 15.0 | 20.0 25 | 13.5 34 | 1 | 22 25 | 17.2 | 2.1 | 16.5 | 10 34 | 14.9 | 2.6 | 14.0 | SEP 21 |
| OCT 1 | 13.0 | 3.6 | 16.0 | 24.9 26 | 14.0 34 | 1 | 25 26 | 18.7 | 3.5 | 17.5 | 14 34 | 17.0 | 3.4 | 15.5 | OCT 1 |
| OCT 11 | 15.5 | 3.2 | 17.5 | 23.5 26 | 14.3 31 | 1 | 25 26 | 19.6 | 3.2 | 19.0 | 14 34 | 17.4 | 3.3 | 16.5 | OCT 11 |
| OCT 21 | 18.2 | 2.9 | 19.5 | 23.0 25 | 15.2 29 | 1 | 25 25 | 20.0 | 3.1 | 20.5 | 14 31 | 18.3 | 3.2 | 19.0 | OCT 21 |
| MONTH | | | | | | | | | | | | | | | |
| MAY | 20.6 | 1.2 | 20.0 | 22.6 10 | 17.9 34 | 1 | 26 20 | 24.7 | 0.8 | 24.5 | 13 34 | 17.3 | 2.0 | 17.5 | MAY |
| JUN | 16.3 | 1.7 | 16.0 | 19.3 25 | 13.0 19 | 1 | 21 17 | 18.6 | 1.3 | 19.0 | 9 19 | 13.7 | 2.7 | 13.5 | JUN |
| JUL | 13.0 | 2.3 | 13.0 | 16.6 25 | 8.6 19 | 1 | 19 25 | 14.9 | 2.7 | 15.5 | 8 19 | 11.3 | 2.1 | 11.0 | JUL |
| AUG | 12.8 | 2.0 | 11.5 | 17.2 25 | 10.9 31 | 1 | 19 25 | 14.4 | 2.3 | 14.5 | 9 19 | 11.2 | 2.0 | 11.0 | AUG |
| SEP | 14.7 | 2.3 | 14.0 | 18.7 25 | 11.6 31 | 1 | 22 25 | 17.3 | 2.1 | 17.0 | 10 34 | 12.4 | 2.3 | 12.0 | SEP |
| OCT | 19.6 | 3.1 | 17.5 | 23.3 26 | 15.0 31 | 1 | 25 26 | 20.5 | 3.2 | 20.5 | 14 34 | 16.6 | 2.9 | 15.5 | OCT |

Table 22: FM1000 summary table, Yellowstone Park, 1910-34, selected years

POOR QUALITY

The following pages are scanned at the best possible quality setting. The original pages are of poor quality and this is the best possible reproduction.

1978 NFDRS ENERGY RELEASE

MEAN, STANDARD DEVIATION, AND EXTREME VALUES

| 1910-1934 | | | | | | 1910-1934 | | | | | | | | | |
|-----------------------------|------|-----------|--------|---------|---------|-----------------------------|------|-----------|--------|-------|------|-----------|--------|-------------|--|
| 10-DAY AND MONTHLY EXTREMES | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | |
| DATE | MEAN | STD. DEV. | MEDIAN | HIGHEST | LOWEST | DATE | MEAN | STD. DEV. | MEDIAN | LOW | AVG. | STD. DEV. | MEDIAN | PRD. BEGINS | |
| | | | | | | | | | | | | | | | |
| MAY 1 | 28.4 | 5.4 | 26.5 | 41.2 34 | 20.8 10 | MAY 1 | 28.4 | 5.4 | 26.5 | 8 17 | 12.8 | 3.0 | 12.5 | MAY 1 | |
| MAY 11 | 28.4 | 5.4 | 26.5 | 41.2 34 | 20.8 10 | MAY 11 | 28.4 | 5.4 | 26.5 | 19 26 | 25.6 | 5.2 | 25.0 | MAY 11 | |
| MAY 21 | 28.4 | 5.4 | 26.5 | 41.2 34 | 20.8 10 | MAY 21 | 28.4 | 5.4 | 26.5 | 27 25 | 36.6 | 8.0 | 34.0 | MAY 21 | |
| JUN 1 | 38.0 | 9.3 | 39.0 | 57.0 19 | 21.0 26 | JUN 1 | 38.0 | 9.3 | 39.0 | 23 25 | 37.3 | 8.0 | 37.0 | JUN 1 | |
| JUN 11 | 38.0 | 9.3 | 39.0 | 57.0 19 | 21.0 26 | JUN 11 | 38.0 | 9.3 | 39.0 | 15 25 | 25.0 | 5.0 | 26.5 | JUN 11 | |
| JUN 21 | 38.0 | 9.3 | 39.0 | 57.0 19 | 21.0 26 | JUN 21 | 38.0 | 9.3 | 39.0 | 7 25 | 18.4 | 8.3 | 16.0 | JUN 21 | |
| JUL 1 | 51.6 | 10.4 | 50.5 | 72.9 19 | 37.3 25 | JUL 1 | 51.6 | 10.4 | 50.5 | | | | | JUL 1 | |
| JUL 11 | 51.6 | 10.4 | 50.5 | 72.9 19 | 37.3 25 | JUL 11 | 51.6 | 10.4 | 50.5 | | | | | JUL 11 | |
| JUL 21 | 51.6 | 10.4 | 50.5 | 72.9 19 | 37.3 25 | JUL 21 | 51.6 | 10.4 | 50.5 | | | | | JUL 21 | |
| AUG 1 | 51.4 | 9.7 | 55.0 | 61.5 31 | 32.4 25 | AUG 1 | 51.4 | 9.7 | 55.0 | | | | | AUG 1 | |
| AUG 11 | 51.4 | 9.7 | 55.0 | 61.5 31 | 32.4 25 | AUG 11 | 51.4 | 9.7 | 55.0 | | | | | AUG 11 | |
| AUG 21 | 51.4 | 9.7 | 55.0 | 61.5 31 | 32.4 25 | AUG 21 | 51.4 | 9.7 | 55.0 | | | | | AUG 21 | |
| SEP 1 | 40.7 | 9.2 | 41.0 | 54.1 31 | 26.3 25 | SEP 1 | 40.7 | 9.2 | 41.0 | | | | | SEP 1 | |
| SEP 11 | 40.7 | 9.2 | 41.0 | 54.1 31 | 26.3 25 | SEP 11 | 40.7 | 9.2 | 41.0 | | | | | SEP 11 | |
| SEP 21 | 40.7 | 9.2 | 41.0 | 54.1 31 | 26.3 25 | SEP 21 | 40.7 | 9.2 | 41.0 | | | | | SEP 21 | |
| OCT 1 | 28.3 | 9.7 | 26.5 | 39.9 31 | 15.3 25 | OCT 1 | 28.3 | 9.7 | 26.5 | | | | | OCT 1 | |
| OCT 11 | 28.3 | 9.7 | 26.5 | 39.9 31 | 15.3 25 | OCT 11 | 28.3 | 9.7 | 26.5 | | | | | OCT 11 | |
| OCT 21 | 28.3 | 9.7 | 26.5 | 39.9 31 | 15.3 25 | OCT 21 | 28.3 | 9.7 | 26.5 | | | | | OCT 21 | |

Table 23: 1978 NFDRS ERC (G/3) summary table, Yellowstone Park, 1910-34, selected years.

STATION NUMBER 249999 YELLOWSTONE

1910-1934

| 10-DAY AND MONTHLY PERIOD MEANS | | | | | | | | | | 10-DAY AND MONTHLY EXTREMES | | | | | | | | | |
|---------------------------------|------|------|--------|---------|---------|---|----------|------|------|-----------------------------|---------|--------|------|------|--------|--------|--|------|--|
| PRD. | | STD. | | HIGHEST | LOWEST | | | | | AVG. | STD. | MEDIAN | | AVG. | STD. | MEDIAN | | PRD. | |
| BEGINS | MEAN | DEV. | MEDIAN | AVG, YR | AVG, YR | | HIGH, YR | HIGH | DEV. | HIGH | LOW, YR | LOW | DEV. | LOW | BEGINS | | | | |
| MAY 1 | 10.1 | 1.9 | 10.0 | 13.7 14 | 7.7 20 | I | 24 34 | 17.7 | 3.7 | 17.0 | 1 10 | 4.1 | 2.4 | 4.0 | MAY 1 | | | | |
| MAY 11 | 10.3 | 0.9 | 10.0 | 11.7 34 | 8.6 14 | I | 21 34 | 18.6 | 1.7 | 18.5 | 2 17 | 3.8 | 1.2 | 4.0 | MAY 11 | | | | |
| MAY 21 | 9.9 | 1.9 | 10.0 | 12.2 34 | 7.1 10 | I | 24 14 | 16.5 | 4.0 | 15.0 | 2 31 | 3.4 | 1.2 | 3.0 | MAY 21 | | | | |
| JUN 1 | 10.6 | 1.6 | 11.0 | 12.2 19 | 7.5 31 | I | 28 17 | 20.1 | 5.7 | 19.0 | 2 14 | 4.0 | 1.2 | 4.0 | JUN 1 | | | | |
| JUN 11 | 10.6 | 1.2 | 10.0 | 12.2 29 | 8.8 17 | I | 36 29 | 20.5 | 7.3 | 20.5 | 3 34 | 4.2 | 1.2 | 4.0 | JUN 11 | | | | |
| JUN 21 | 11.5 | 1.9 | 11.5 | 13.9 31 | 8.5 25 | I | 25 34 | 19.8 | 3.4 | 20.0 | 4 29 | 5.1 | 1.6 | 4.5 | JUN 21 | | | | |
| JUL 1 | 10.3 | 2.0 | 9.0 | 14.0 19 | 8.3 20 | I | 30 19 | 18.9 | 5.0 | 17.5 | 1 31 | 4.2 | 1.9 | 4.0 | JUL 1 | | | | |
| JUL 11 | 10.3 | 1.6 | 10.0 | 12.3 34 | 7.6 17 | I | 32 10 | 18.7 | 6.2 | 16.5 | 3 29 | 4.9 | 1.8 | 4.5 | JUL 11 | | | | |
| JUL 21 | 9.3 | 1.3 | 9.0 | 11.0 17 | 7.1 20 | I | 25 10 | 18.6 | 4.5 | 19.0 | 2 29 | 3.9 | 1.5 | 4.0 | JUL 21 | | | | |
| AUG 1 | 9.6 | 2.0 | 9.5 | 12.7 17 | 6.3 25 | I | 24 17 | 16.7 | 4.0 | 18.0 | 2 26 | 4.4 | 1.4 | 4.5 | AUG 1 | | | | |
| AUG 11 | 8.7 | 1.6 | 8.5 | 10.9 20 | 5.9 31 | I | 24 20 | 15.9 | 3.3 | 15.0 | 1 14 | 3.7 | 2.2 | 3.0 | AUG 11 | | | | |
| AUG 21 | 10.0 | 1.6 | 10.0 | 12.1 10 | 6.5 17 | I | 24 29 | 18.5 | 4.1 | 17.5 | 1 17 | 3.7 | 1.7 | 4.0 | AUG 21 | | | | |
| SEP 1 | 8.9 | 2.1 | 8.0 | 13.3 10 | 6.2 25 | I | 20 10 | 15.3 | 3.0 | 15.0 | 2 31 | 3.4 | 0.8 | 3.0 | SEP 1 | | | | |
| SEP 11 | 8.9 | 2.3 | 8.5 | 12.5 26 | 5.4 17 | I | 24 26 | 17.2 | 5.0 | 18.0 | 2 17 | 3.9 | 1.5 | 3.5 | SEP 11 | | | | |
| SEP 21 | 8.4 | 1.7 | 7.5 | 11.5 26 | 5.7 31 | I | 30 26 | 15.9 | 5.5 | 14.5 | 0 31 | 3.3 | 1.4 | 4.0 | SEP 21 | | | | |
| OCT 1 | 8.2 | 1.6 | 8.0 | 10.2 20 | 5.2 17 | I | 22 10 | 15.8 | 3.8 | 16.0 | 2 19 | 3.4 | 1.3 | 3.0 | OCT 1 | | | | |
| OCT 11 | 7.1 | 1.5 | 7.0 | 9.3 19 | 4.7 31 | I | 22 14 | 14.8 | 3.9 | 15.0 | 0 31 | 2.2 | 1.3 | 2.5 | OCT 11 | | | | |
| OCT 21 | 7.8 | 1.7 | 7.0 | 10.5 34 | 5.8 25 | I | 30 26 | 16.5 | 6.2 | 15.0 | 1 25 | 2.3 | 0.9 | 2.0 | OCT 21 | | | | |
| MONTH | | | | | | I | | | | | | | | | MONTH | | | | |
| MAY | 10.1 | 1.2 | 10.0 | 12.0 34 | 8.5 10 | I | 24 34 | 19.9 | 3.0 | 19.5 | 1 10 | 2.6 | 1.0 | 2.5 | MAY | | | | |
| JUN | 10.9 | 0.8 | 10.0 | 12.2 14 | 9.6 25 | I | 36 29 | 25.9 | 4.2 | 24.5 | 2 14 | 3.3 | 0.7 | 3.0 | JUN | | | | |
| JUL | 9.9 | 1.2 | 9.5 | 11.8 19 | 7.9 20 | I | 32 10 | 22.4 | 5.0 | 20.5 | 1 31 | 3.0 | 1.2 | 3.0 | JUL | | | | |
| AUG | 9.5 | 0.9 | 9.0 | 10.9 20 | 8.1 31 | I | 24 29 | 20.9 | 3.1 | 21.0 | 1 17 | 2.1 | 0.7 | 2.0 | AUG | | | | |
| SEP | 8.7 | 1.3 | 8.0 | 11.1 26 | 6.8 31 | I | 30 26 | 19.9 | 4.1 | 18.5 | 0 31 | 2.7 | 1.2 | 3.0 | SEP | | | | |
| OCT | 7.7 | 1.1 | 7.5 | 9.3 34 | 6.1 25 | I | 30 26 | 19.5 | 5.3 | 19.0 | 0 31 | 1.7 | 1.1 | 2.0 | OCT | | | | |

Table 24: 5 pm wind speed, Yellowstone Park, 1910-34, selected years.

Figures 1 - 34

Figure 1:

ACCUMULATED PRECIPITATION AT HELENA MONTANA

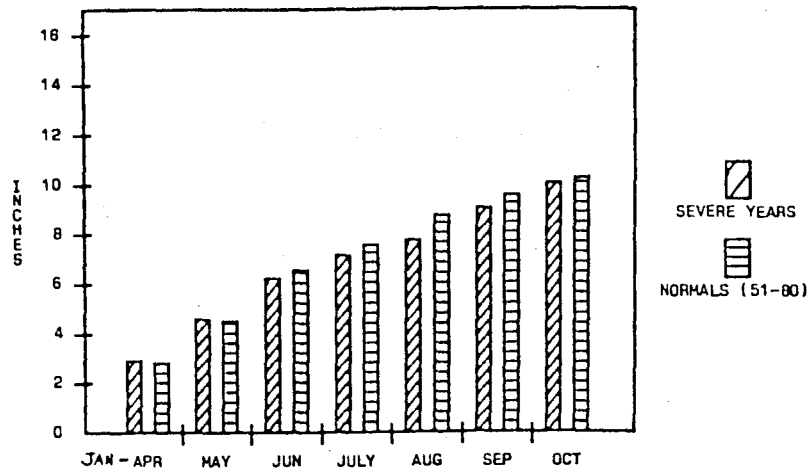


Figure 2:

RATIO OF AVERAGE SEVERE YEARS ACCUM. PRECIP TO NORMAL ACCUM. PRECIP

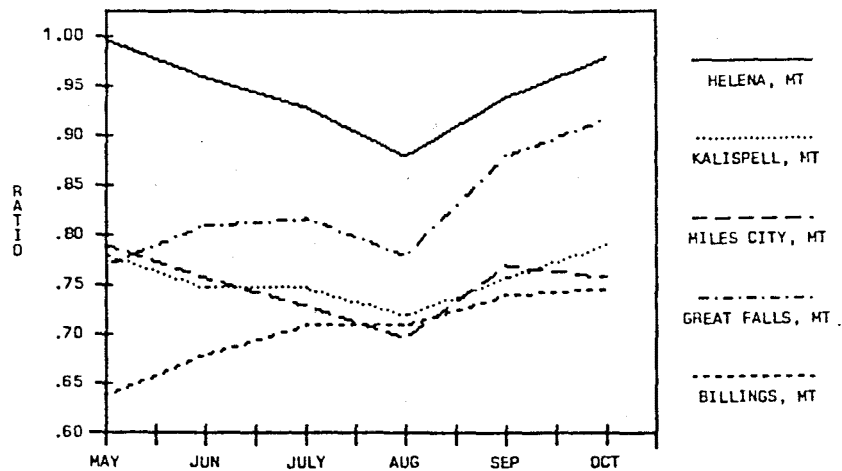


Figure 3:

10-DAY AVERAGE MAXIMUM DAILY TEMPERATURE AT HELENA MONTANA

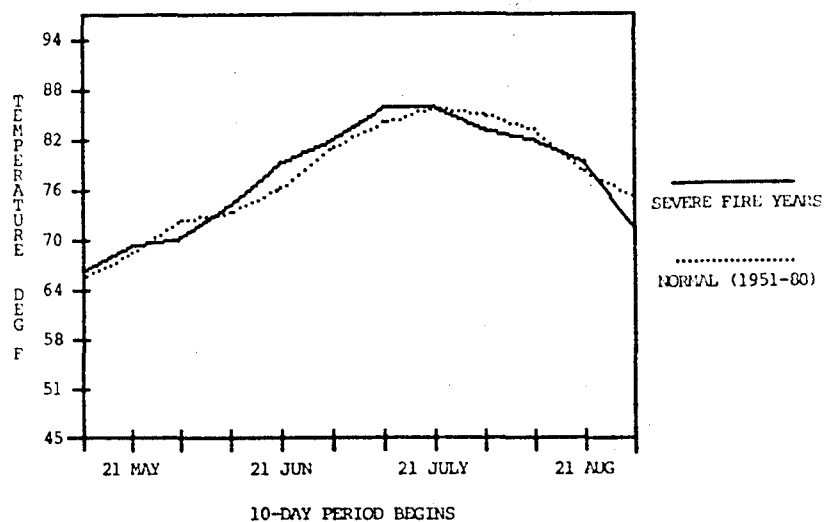


Figure 4:

DEVIATION OF 10-DAY AVE MAX DAILY TEMPERATURE FROM NORMAL AT HELENA MONTANA

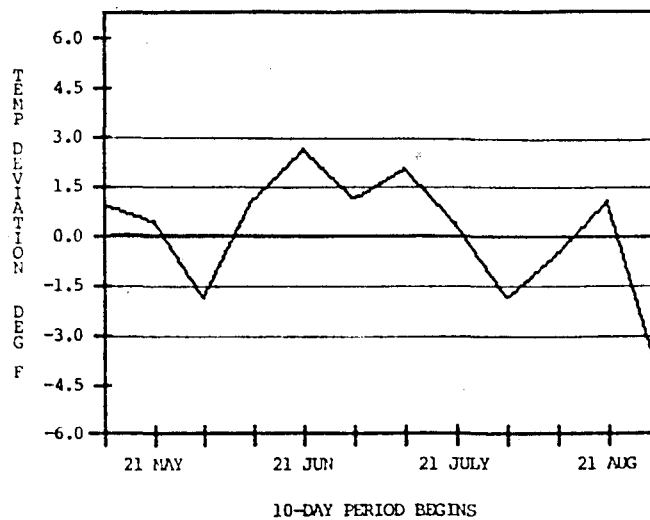


Figure 5:
10-DAY AVERAGE MAX- MIN- & MEAN 5 PM RELATIVE HUMIDITY AT HELENA MONTANA

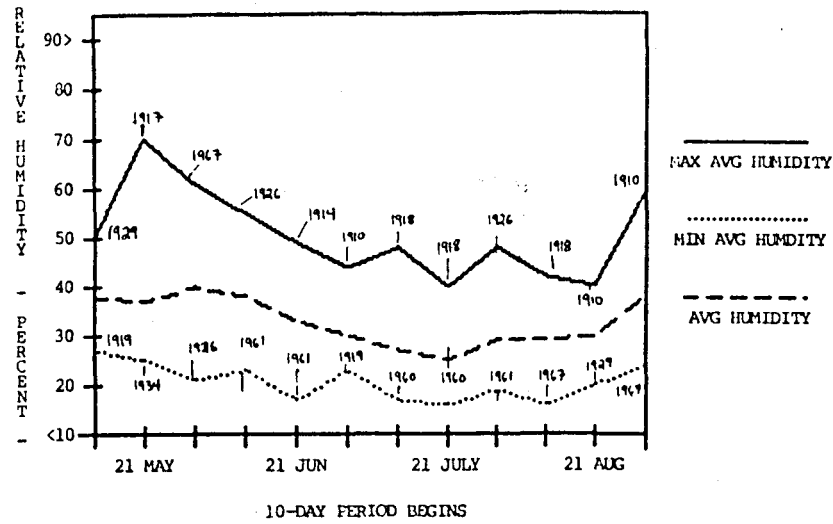


Figure 6:
10-DAY AVERAGE MAX- MIN- & MEAN 1000 HOUR FUEL MOISTURE AT HELENA MONTANA

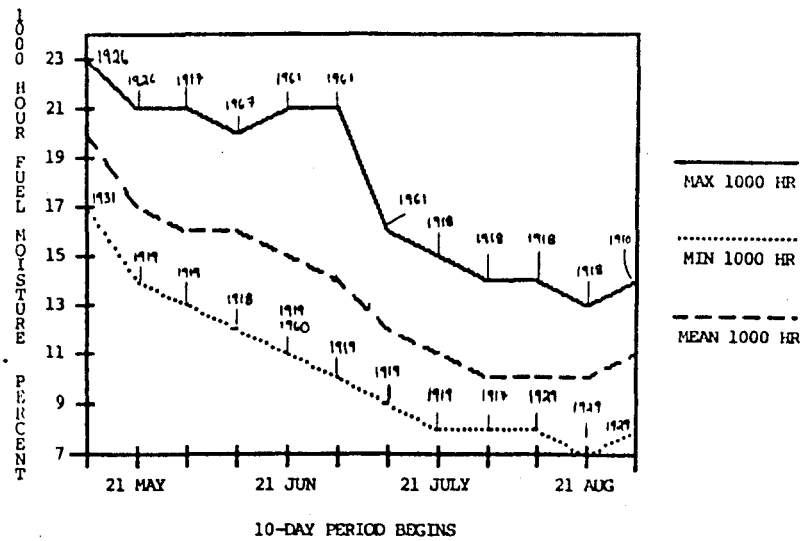


Figure 7:
10-DAY AVERAGE SEVERE FIRE YEARS ENERGY RELEASE FUEL MOISTURE CLASS 3

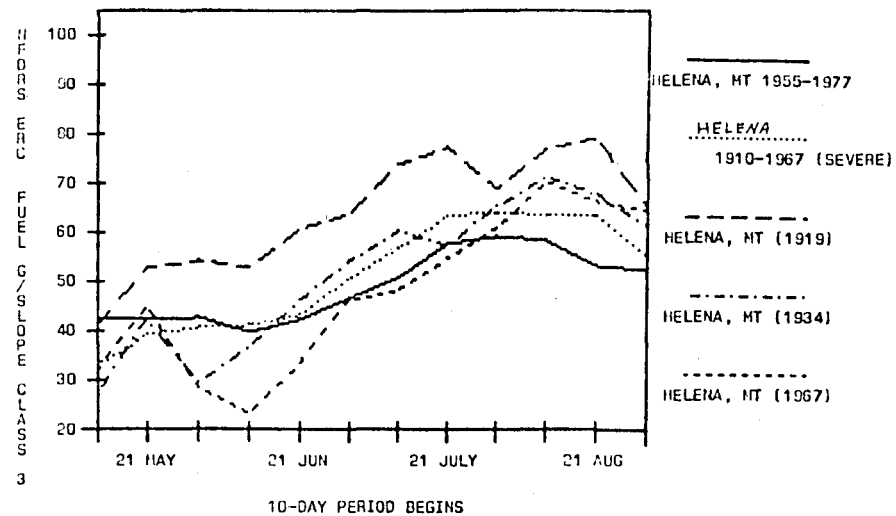


Figure 8:

10-DAY AVERAGE 5 P.M. WIND SPEED AT HELENA MONTANA

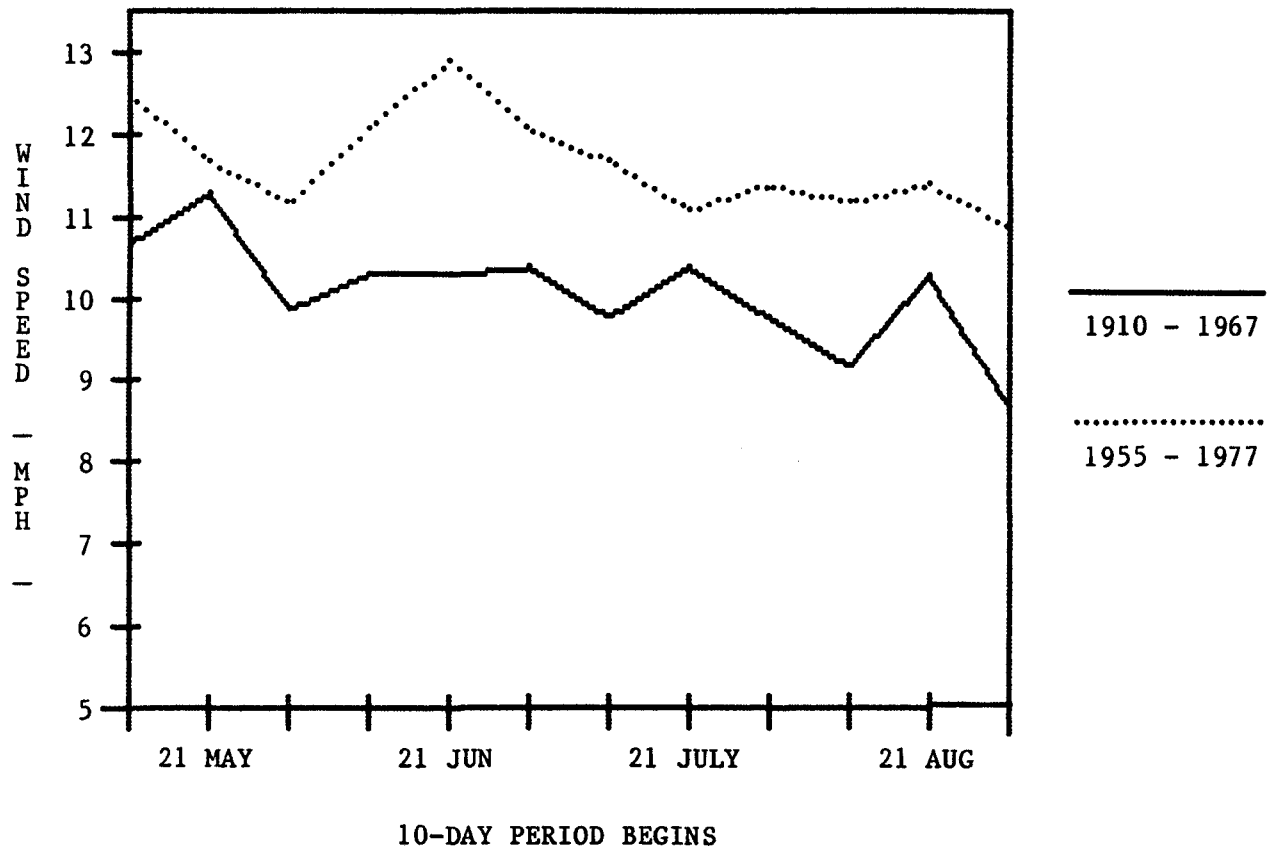


Figure 9:

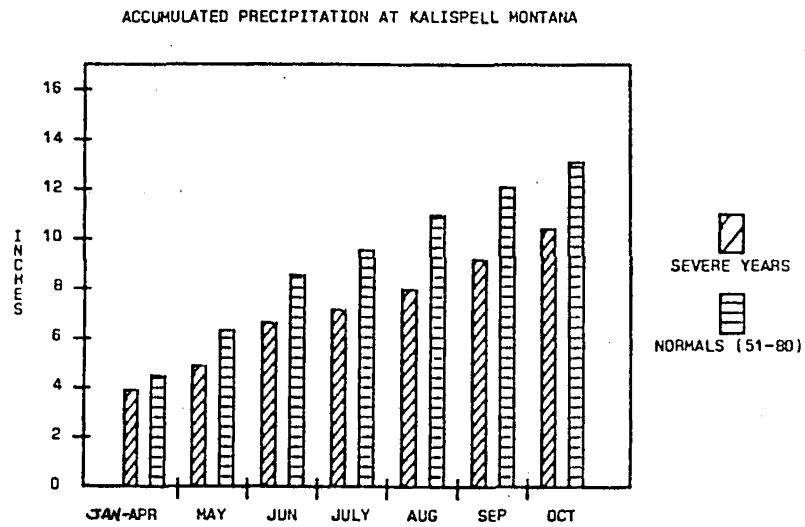


Figure 10:

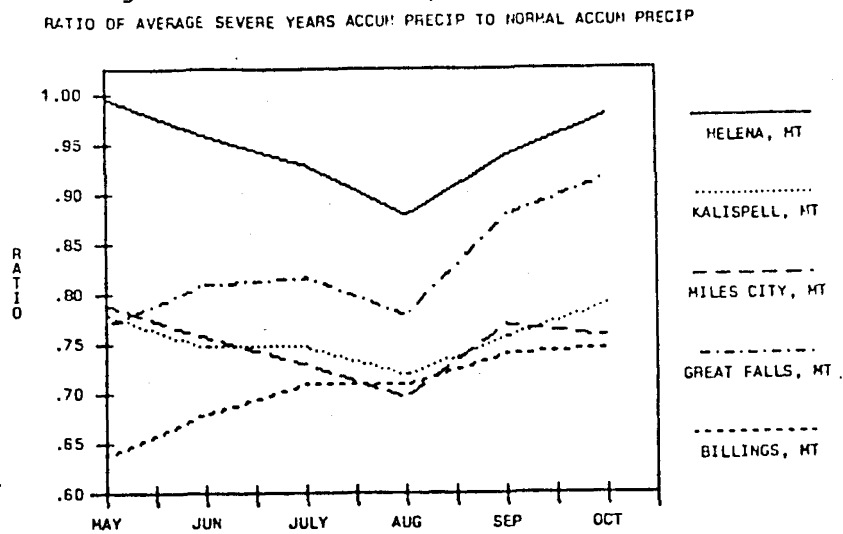


Figure 11:

10-DAY AVERAGE MAXIMUM DAILY TEMPERATURE AT KALISPELL MONTANA

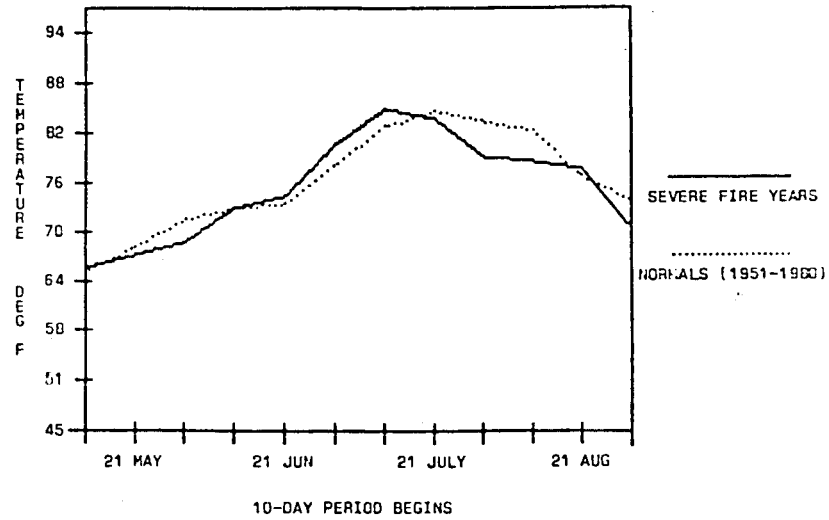


Figure 12:

DEVIATION OF 10-DAY AVE MAX DAILY TEMPERATURE FROM NORMAL AT KALISPELL MONTANA

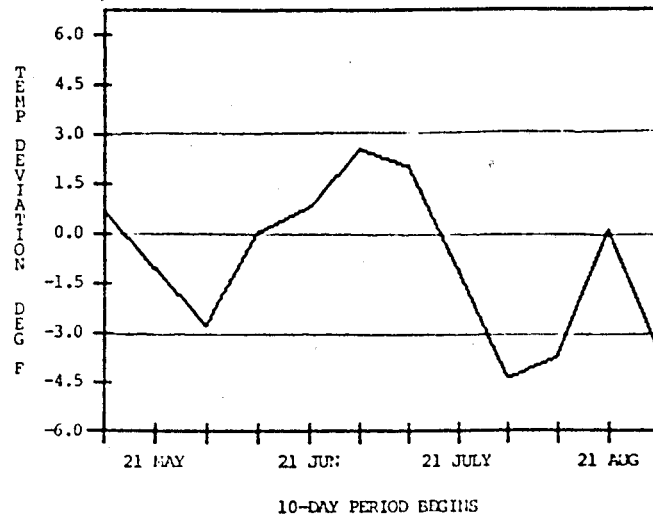


Figure 13:

10-DAY AVERAGE MAX- MIN- & MEAN 5 PM: RELATIVE HUMIDITY AT KALISPELL MONTANA

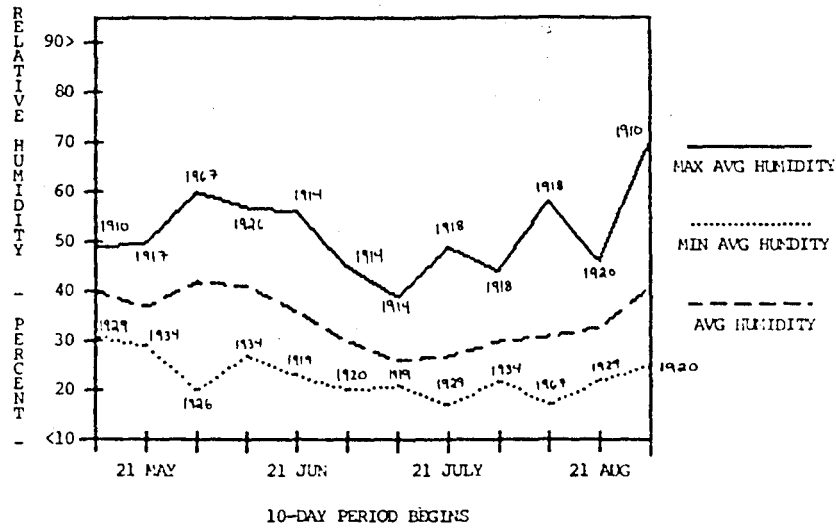


Figure 14:

10-DAY AVERAGE MAX- MIN- & MEAN 1000 HOUR FUEL MOISTURE AT KALISPELL MONTANA

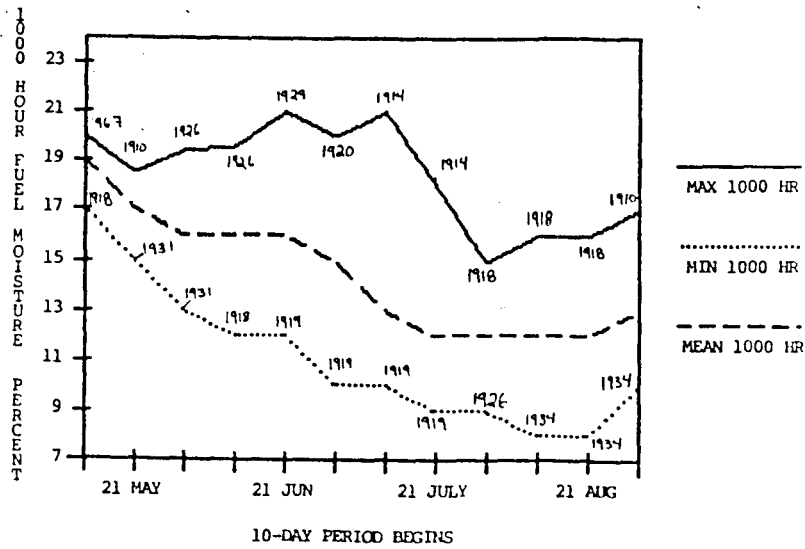


Figure 15:

ACCUMULATED PRECIPITATION AT MILES CITY MONTANA

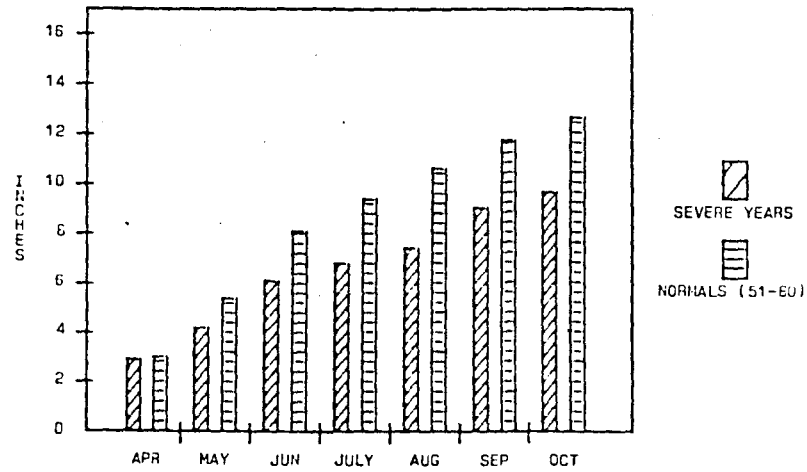


Figure 16:

RATIO OF AVERAGE SEVERE YEARS ACCUM PRECIP TO NORMAL ACCUM PRECIP

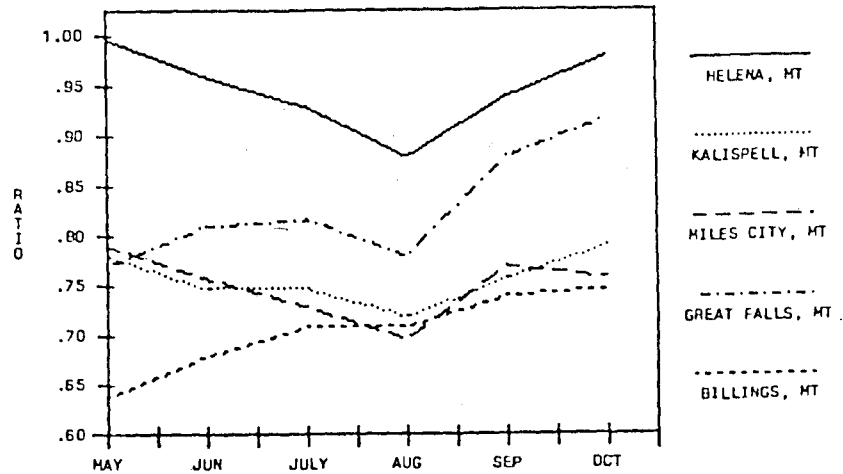


Figure 17:

10-DAY AVERAGE MAXIMUM DAILY TEMPERATURE AT MILES CITY MONTANA

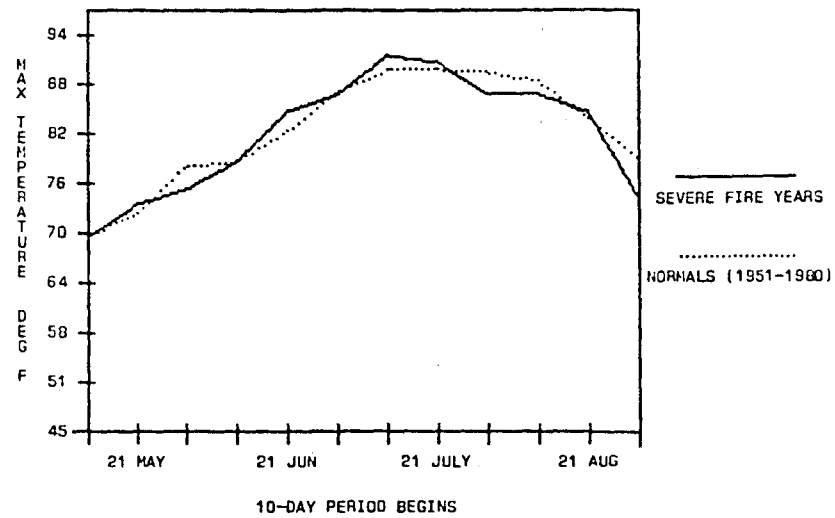


Figure 18:

DEVIATION OF 10-DAY AVE MAX DAILY TEMPERATURE FROM NORMAL AT MILES CITY MONTANA

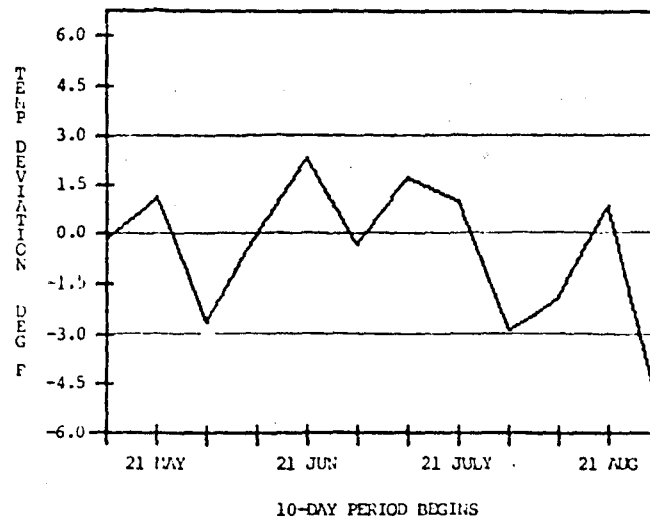


Figure 19:

10-DAY AVERAGE MAX- MIN- & MEAN 5 PM RELATIVE HUMIDITY AT MILES CITY MONTANA

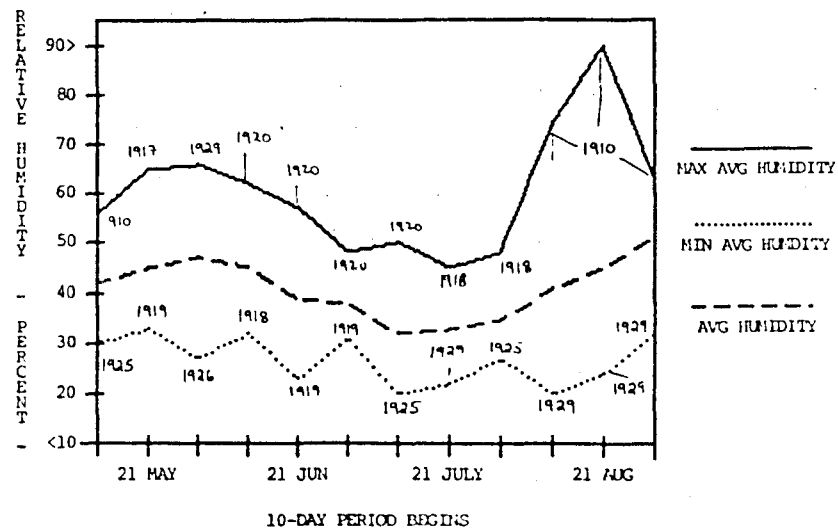


Figure 20:

10-DAY AVERAGE MAX- MIN- & MEAN 1000 HOUR FUEL MOISTURE AT MILES CITY MONTANA

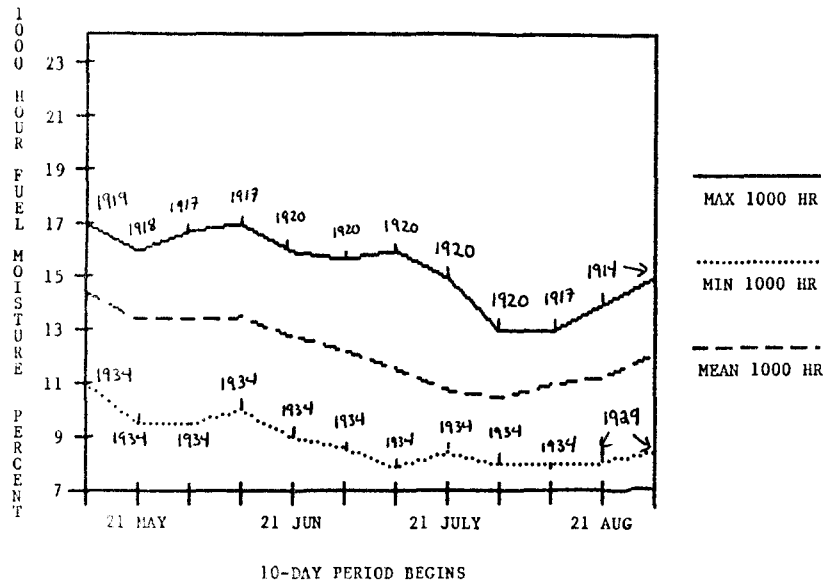


Figure 20a:

10-DAY AVERAGE MAX- MIN- & MEAN 1000 HOUR FUEL MOISTURE AT MILES CITY MONTANA

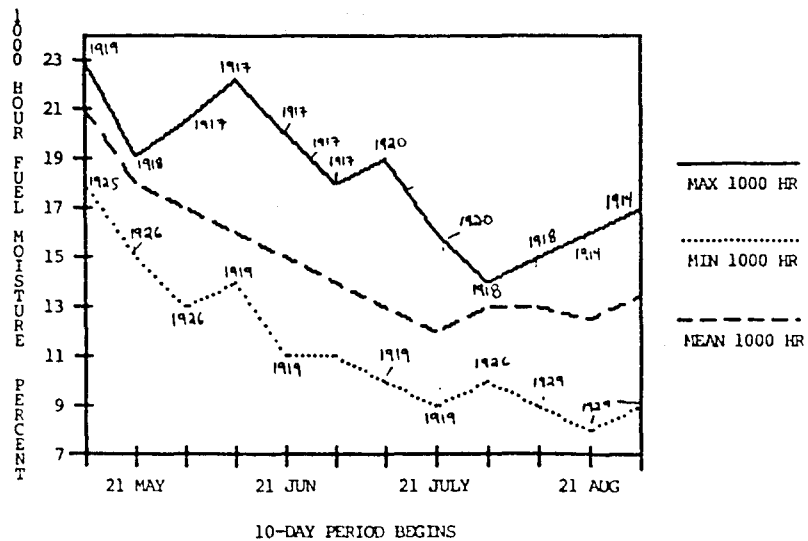


Figure 21:
10-DAY AVERAGE 5 P.M. WIND SPEED AT MILES CITY MONTANA

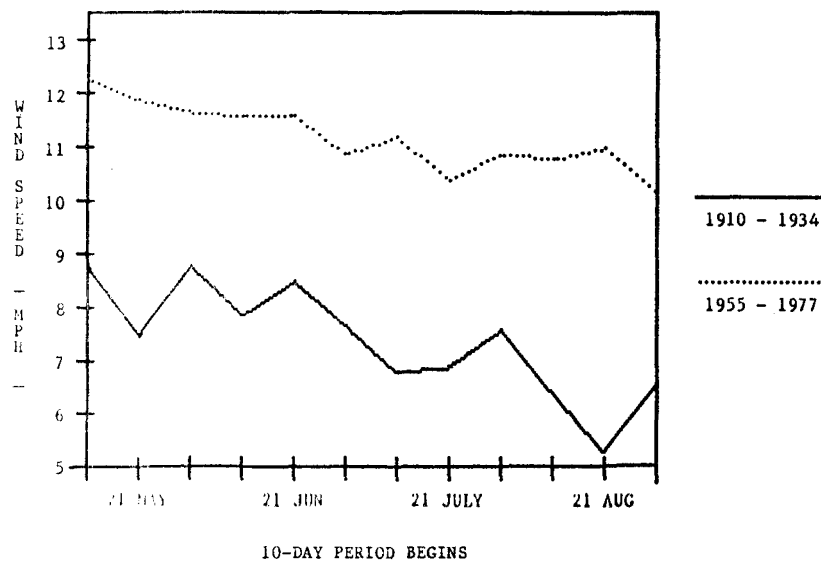


Figure 22:

10-DAY AVERAGE MAX- MIN- & MEAN 5 PM RELATIVE HUMIDITY AT YELLOWSTONE MONTANA

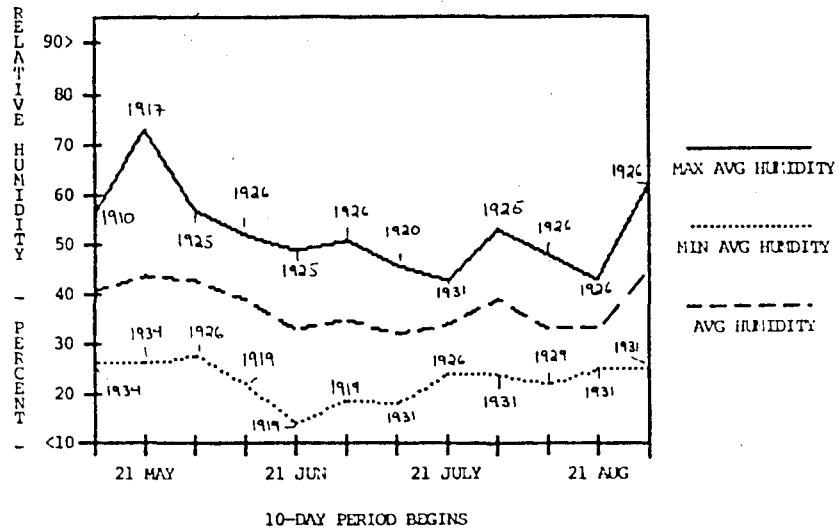


Figure 23:

10-DAY AVERAGE MAX- MIN- & MEAN 1000 HOUR FUEL MOISTURE AT YELLOWSTONE MONTANA

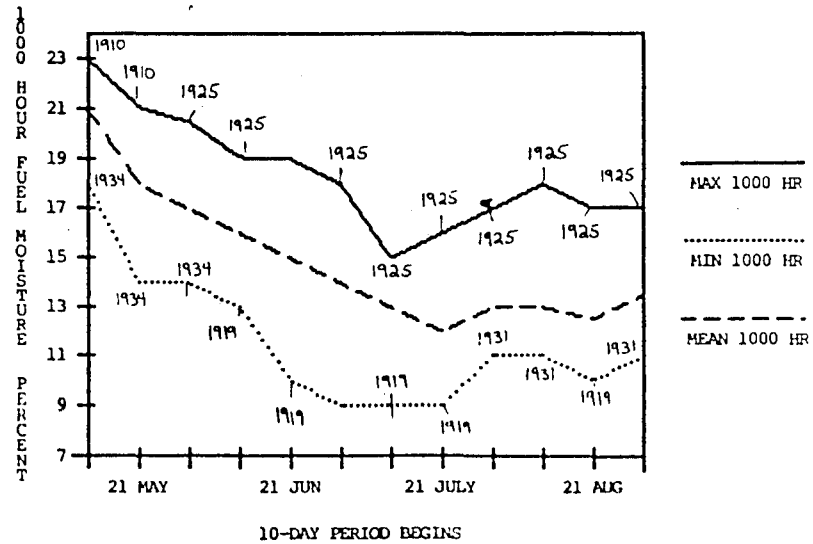


Figure 24:

ACCUMULATED PRECIPITATION AT GREAT FALLS MONTANA

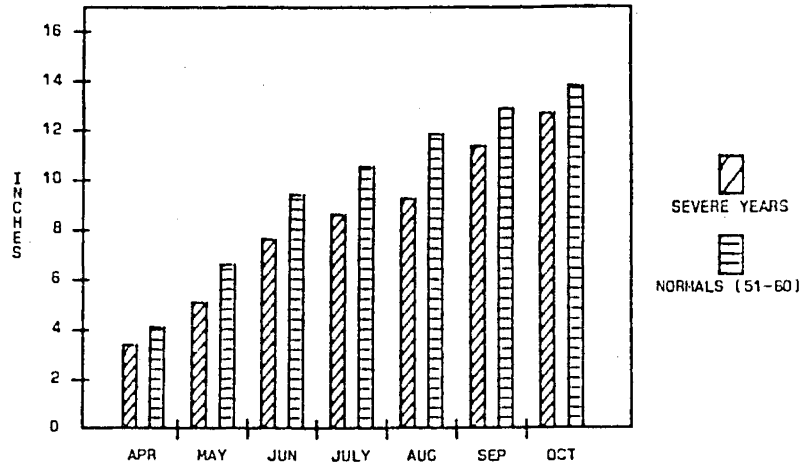


Figure 25:

RATIO OF AVERAGE SEVERE YEARS ACCUM PRECIP TO NORMAL ACCUM PRECIP

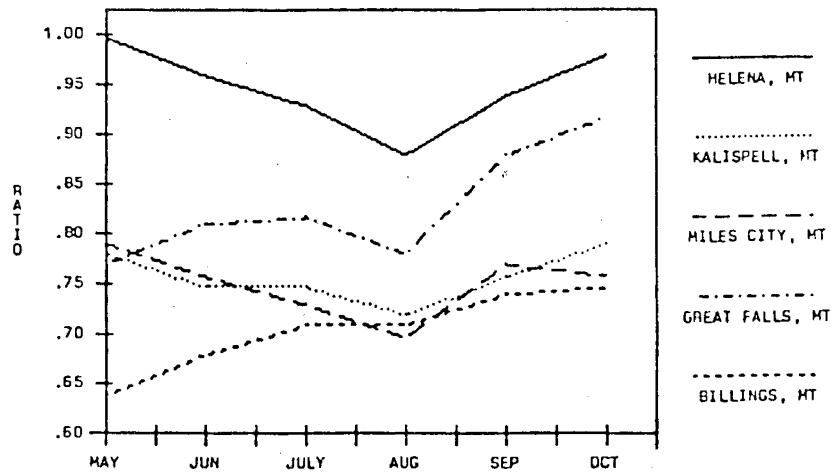


Figure 26:

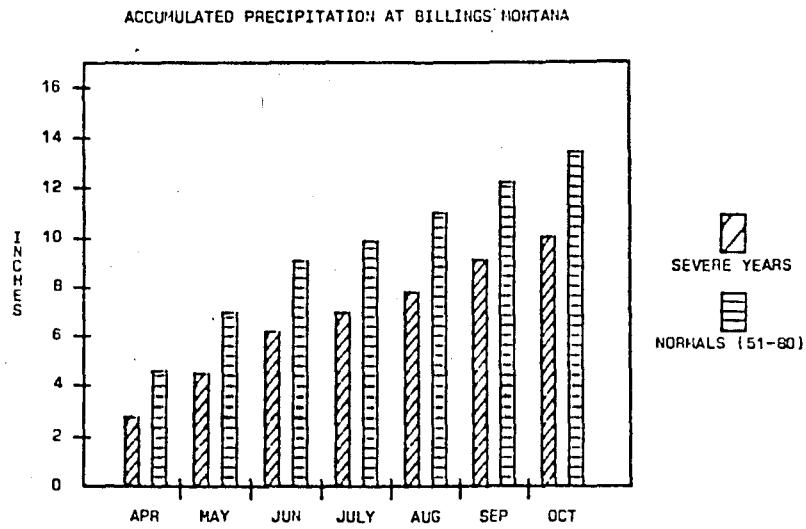


Figure 27:

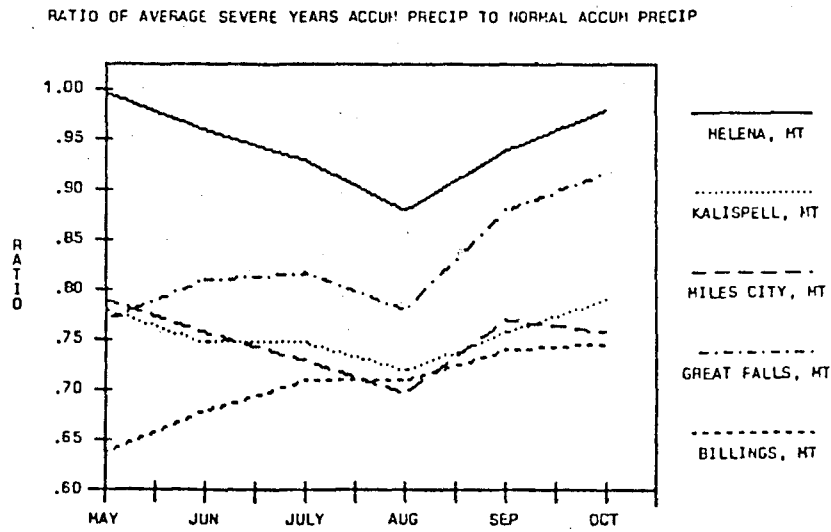


Figure 28:

HELENA MONTANA -- SEVERE YEARS VS. NORMALS (MAX TEMP & ENERGY RELEASE)

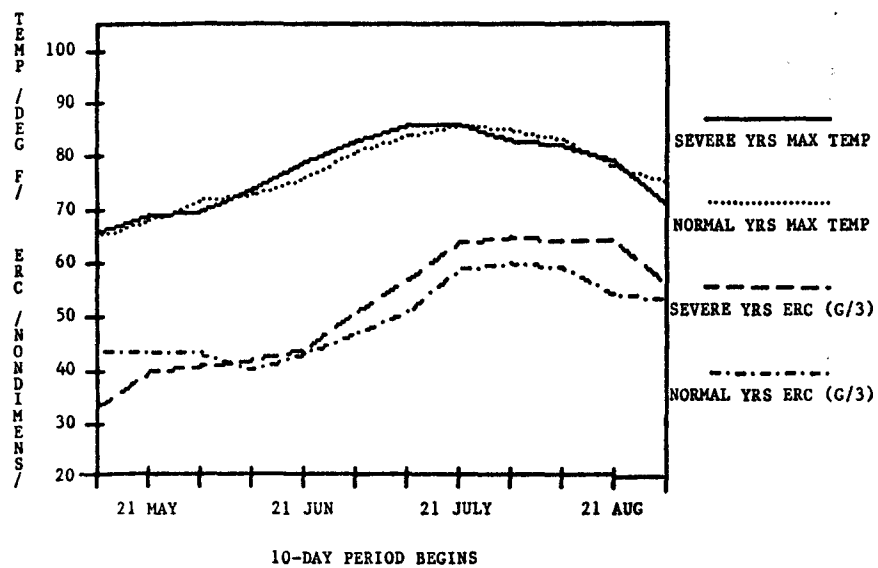


Figure 29 a:

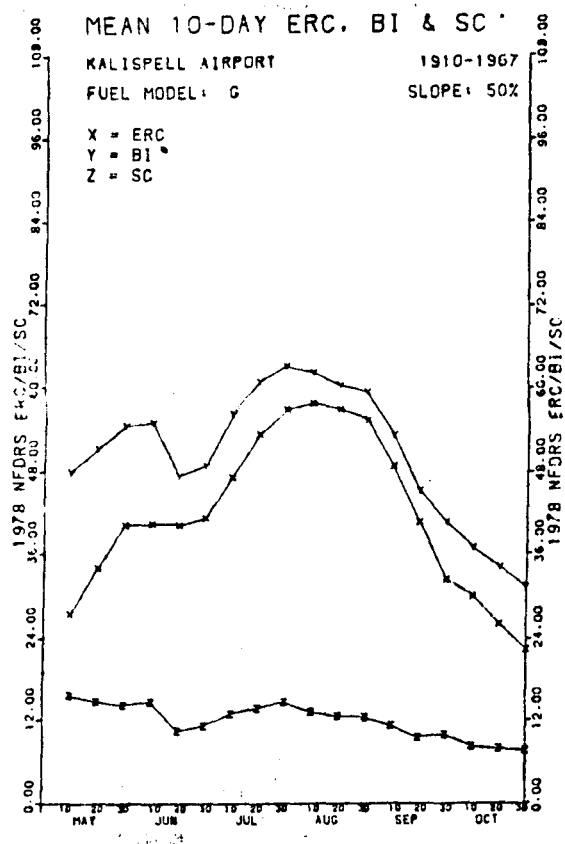


Figure 29 b:

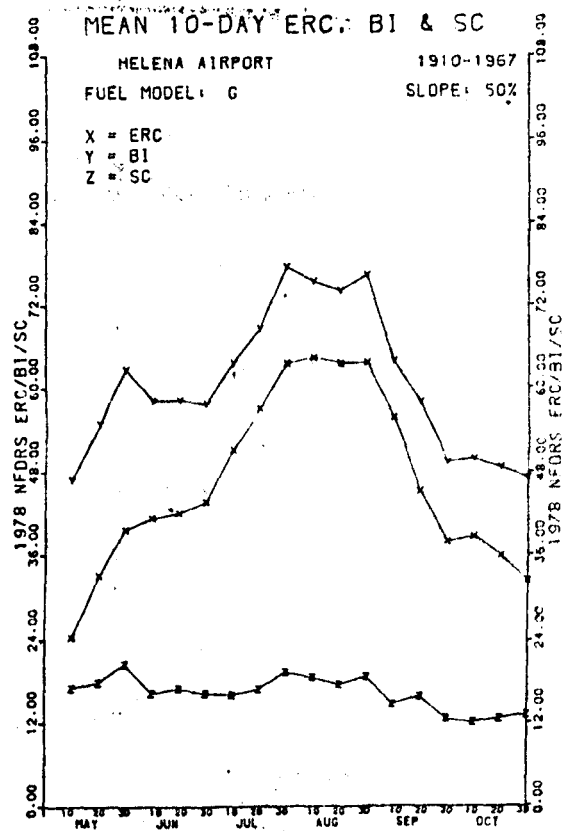


Figure 29 c:

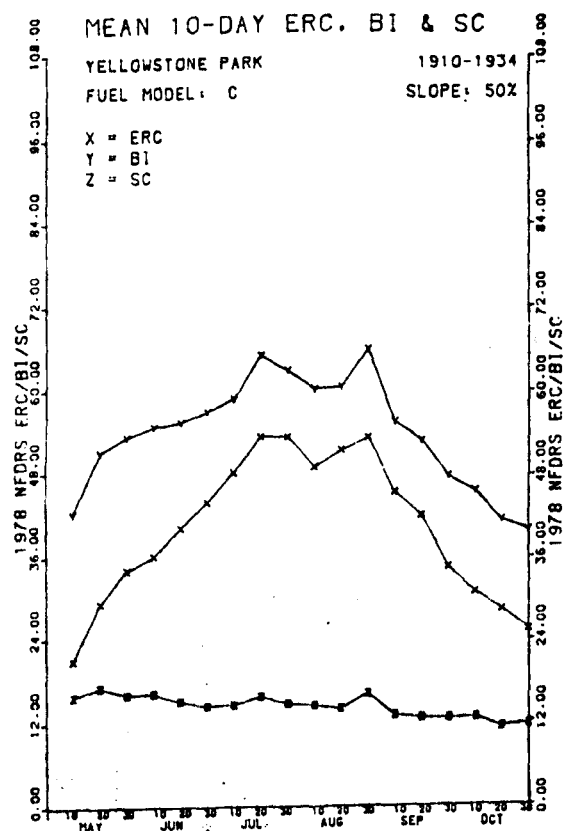


Figure 29 d

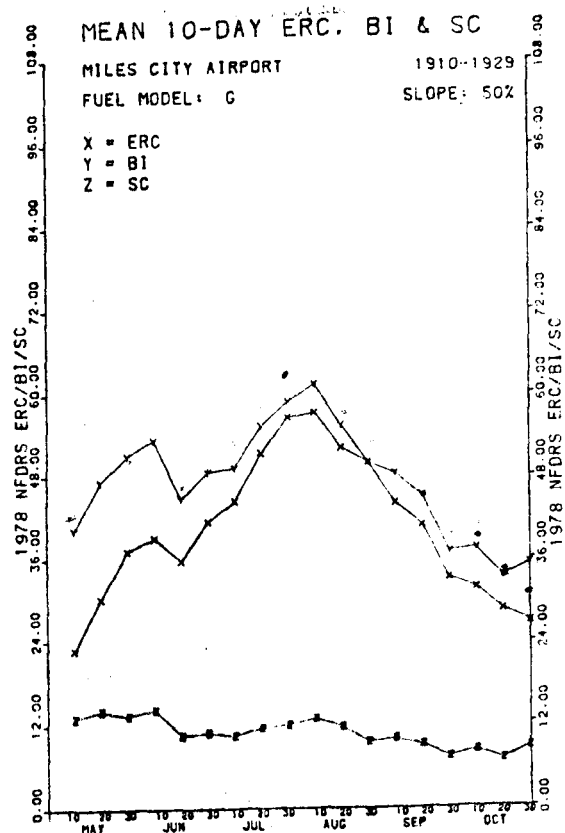


Figure 30 a:

10-DAY AVERAGE 1000 HOUR FUEL MOISTURE FOR 1918 AT THREE MONTANA LOCATIONS

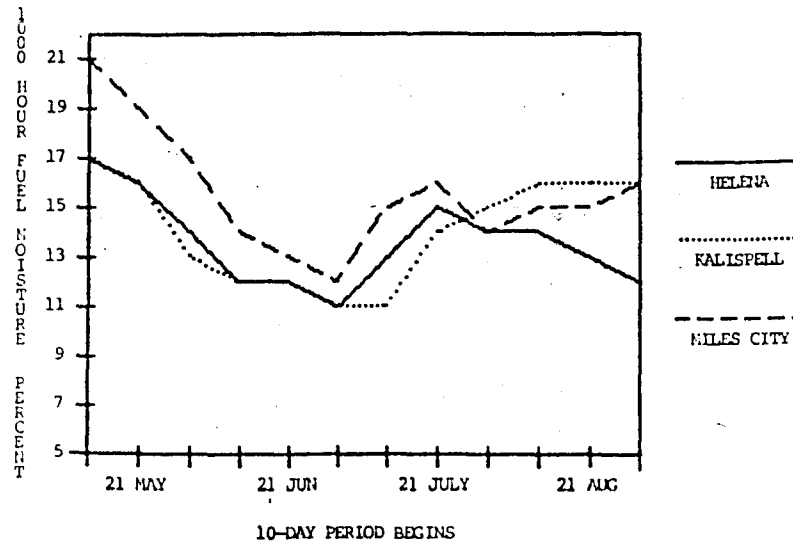


Figure 30 b:

10-DAY AVERAGE 1000 HOUR FUEL MOISTURE FOR 1919 AT FOUR MONTANA LOCATIONS

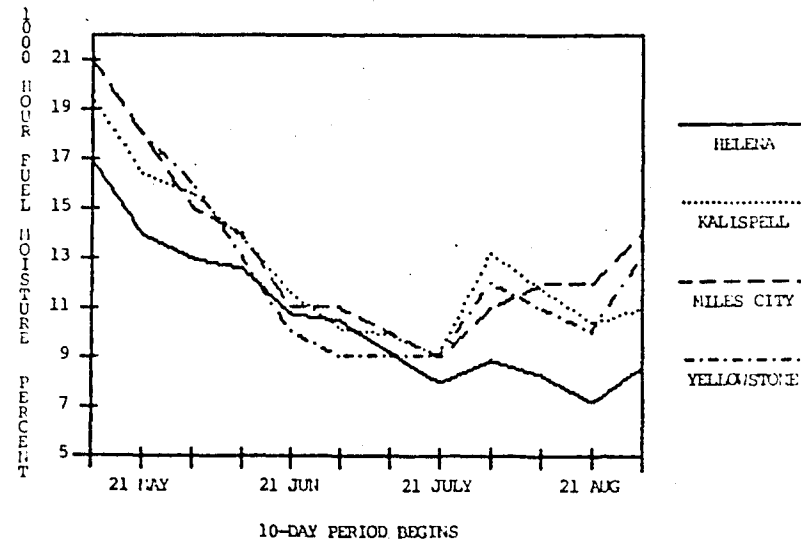


Figure 30 c:

10-DAY AVERAGE 1000 HOUR FUEL MOISTURE FOR 1929 AT FOUR MONTANA LOCATIONS

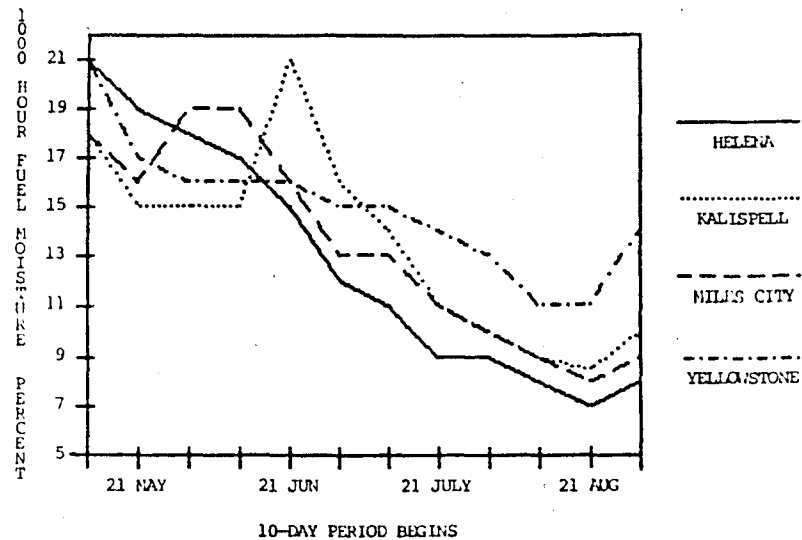


Figure 31 a:

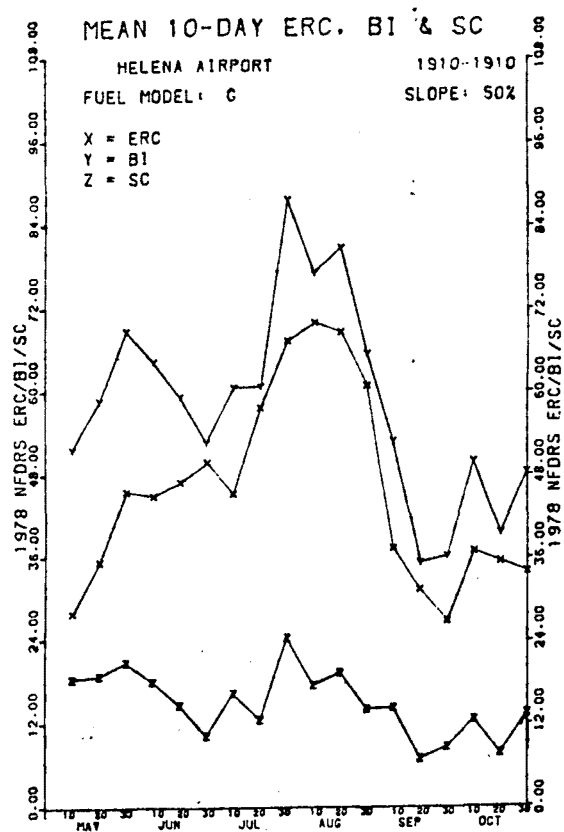


Figure 31 b:

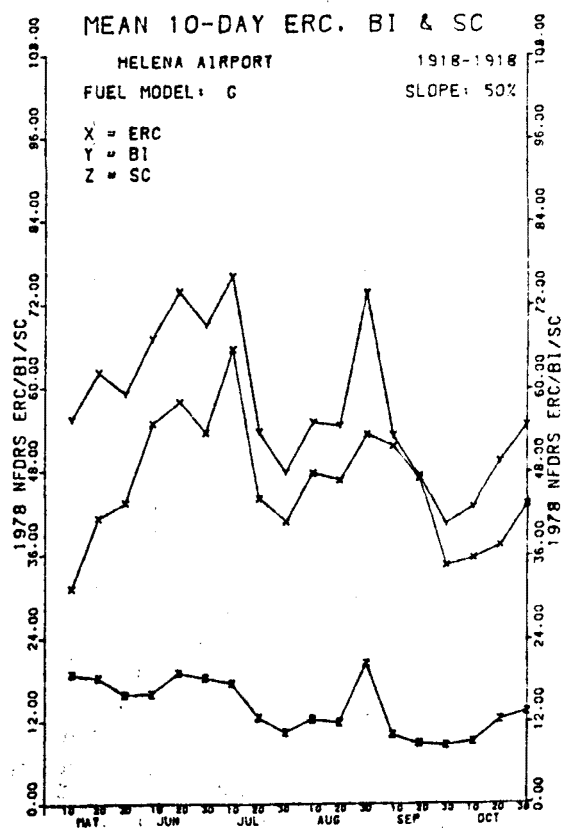


Figure 31 c:

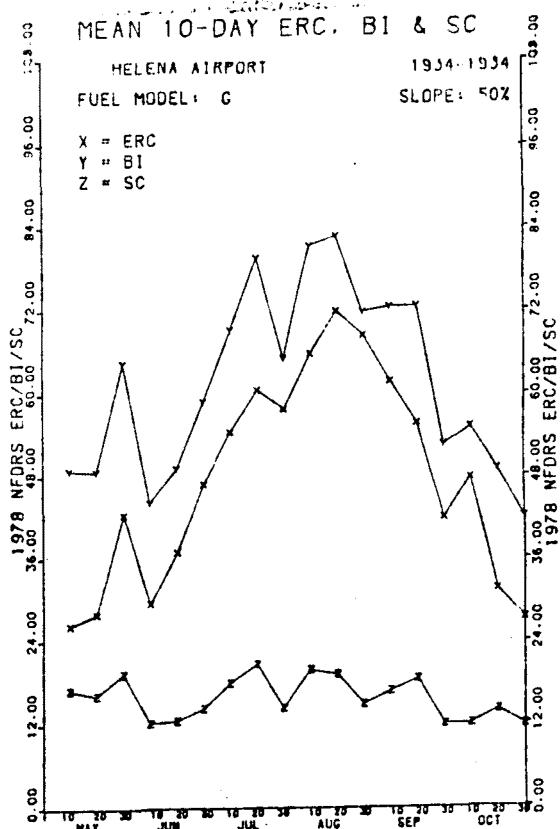


Figure 31 d:

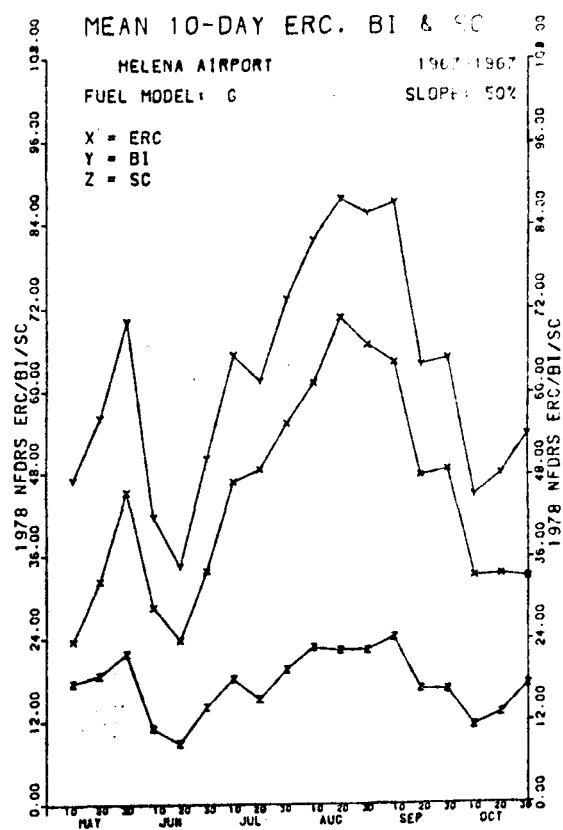


Figure 32 a:

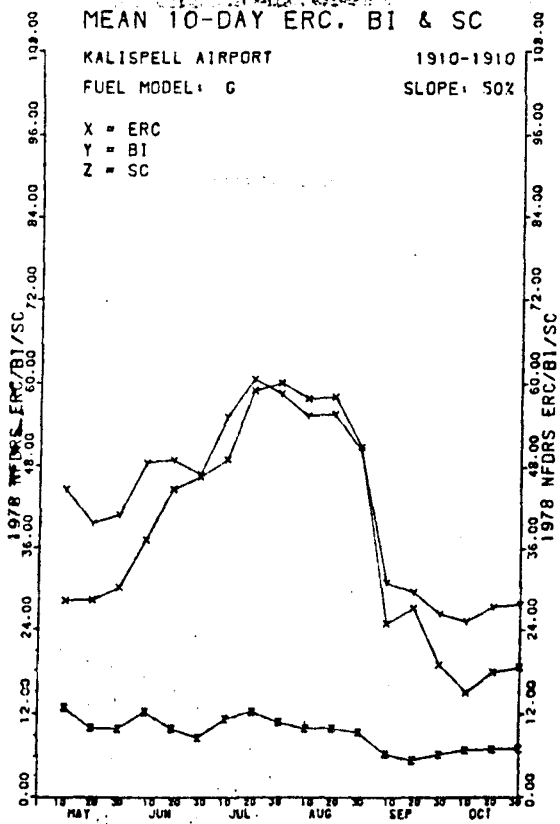


Figure 32 b:

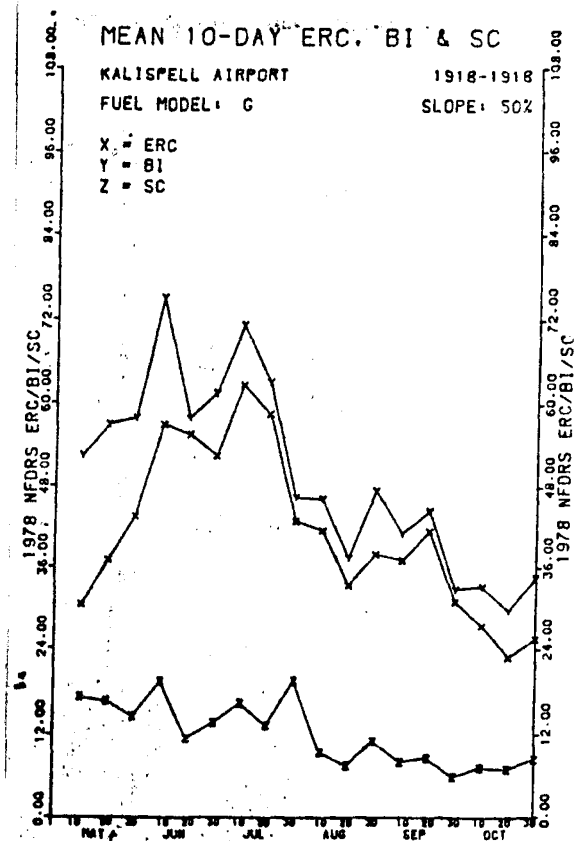


Figure 32 c:

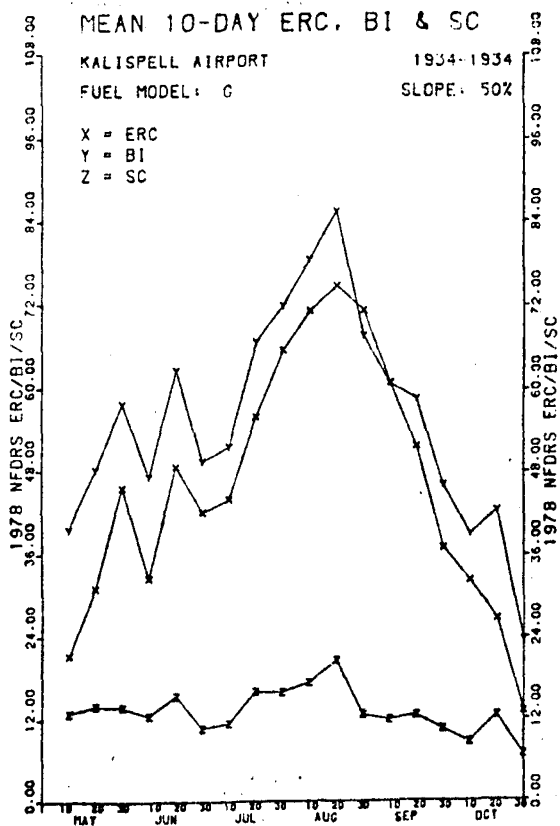


Figure 32 d:

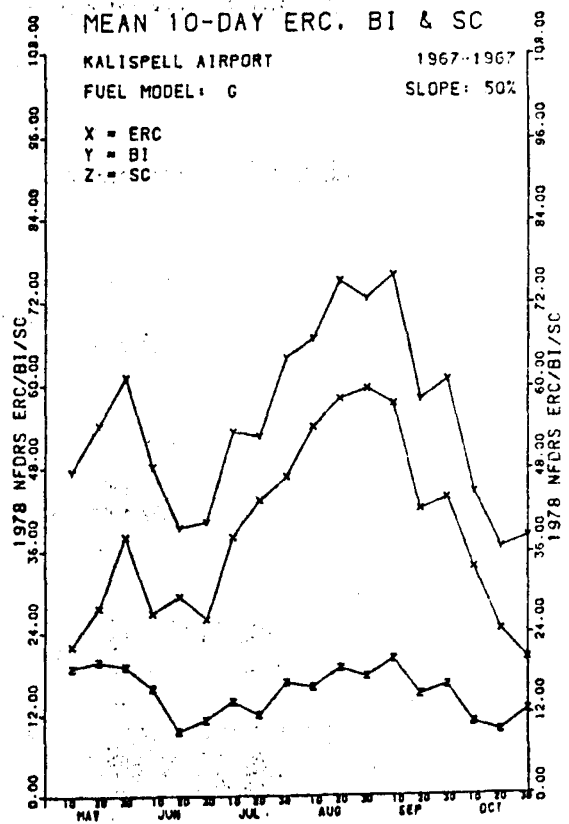


Figure 33 a:

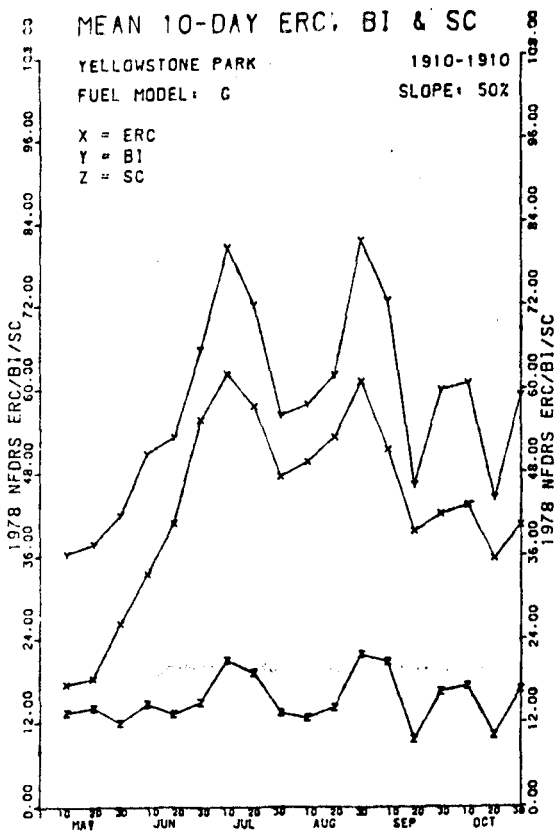


Figure 33 b:

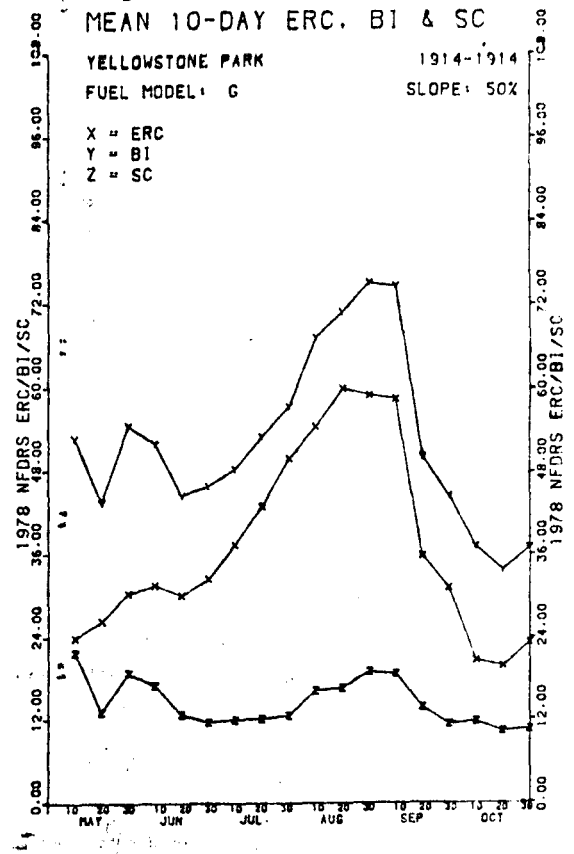


Figure 33 c:

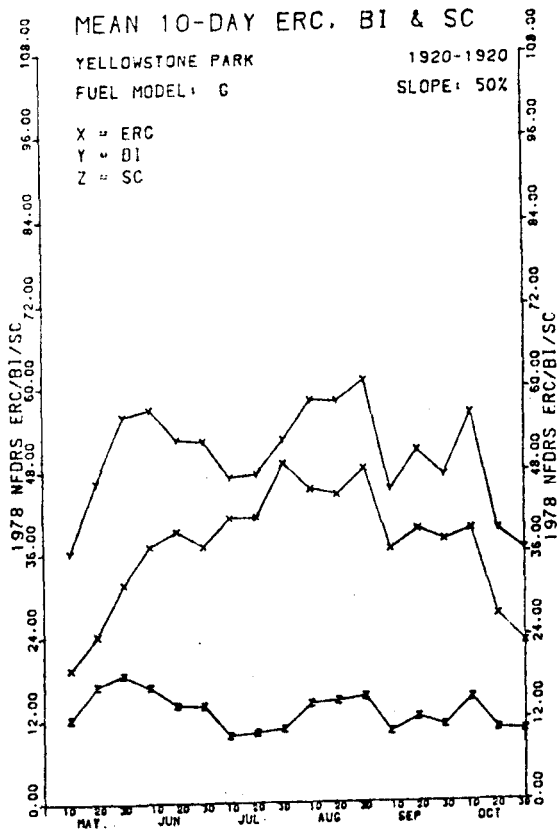


Figure 33 d:

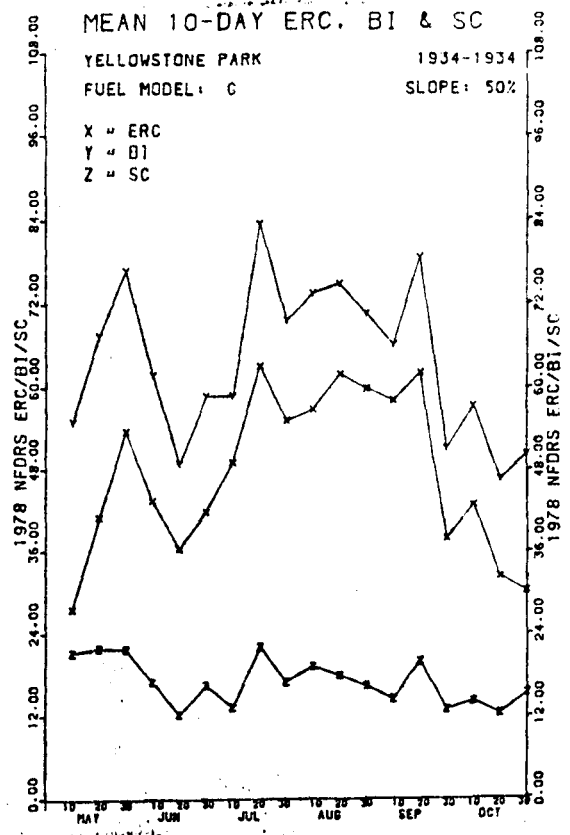
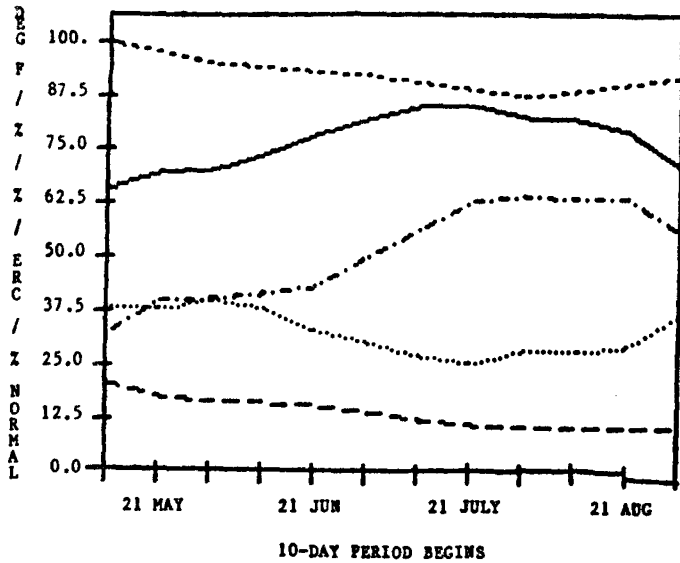


Figure 34 a:

NA MONTANA -- 14 YEARS SEVERE YEARS (1910-1967; 11 MAY - 11 SEP)



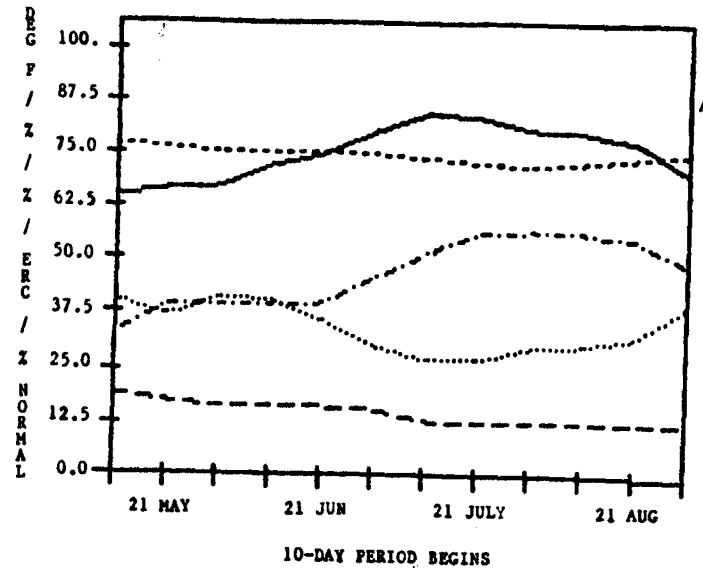
— AVG MAX TEMPERATURE

..... AVG REL HUM (OBS)

--- AVG 1000 HR PM (Z)

Figure 34 b:

KALISPELL MONTANA -- 13 YEARS SEVERE YEARS (1910-1967; 11 MAY - 11 SEP)



..... AVG NFDMS ERC (G/3)

--- AVG ACCUM PRECIP

Figure 34 c:

ELLOWSTONE PARK -- 10 YEARS SEVERE YEARS (1910-1934; 11 MAY - 11 SEP)

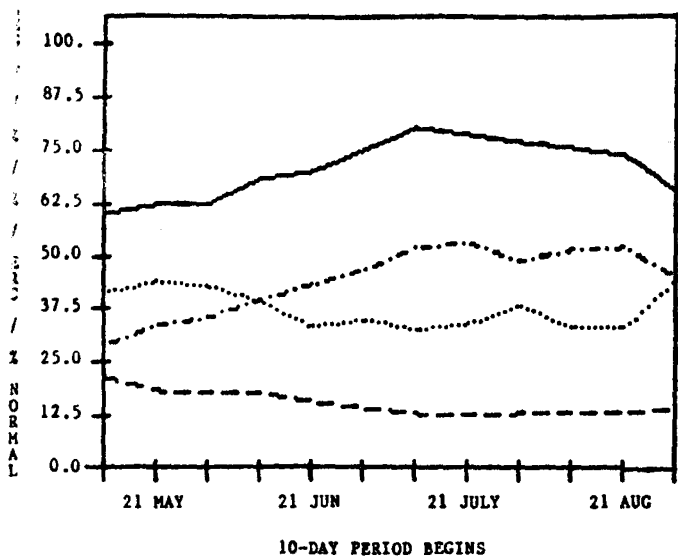
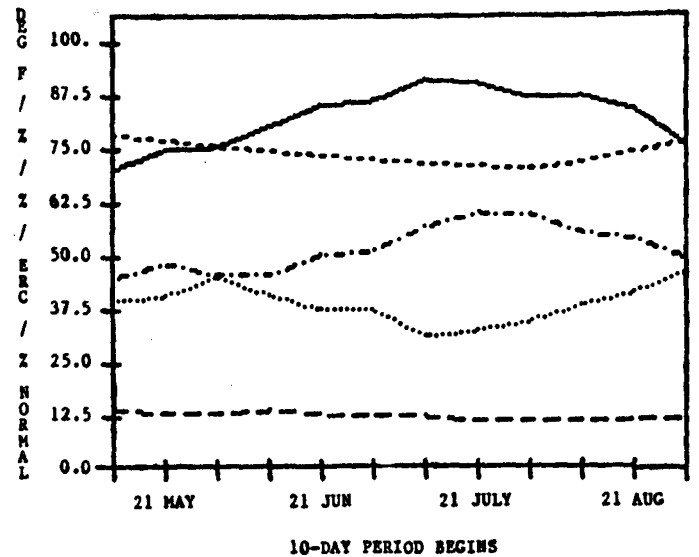


Figure 34 d:

MILES CITY MONTANA -- 11 YEARS SEVERE YEARS (1910-1934; 11 MAY - 11 SEP)



Appendix A

Yearly Seasonal Plots of ERC, BI, and SC for Helena

1910
1914
1917
1918
1919
1920
1925
1926
1929
1931
1934
1960
1961
1967
1910-1967

MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1910-1910

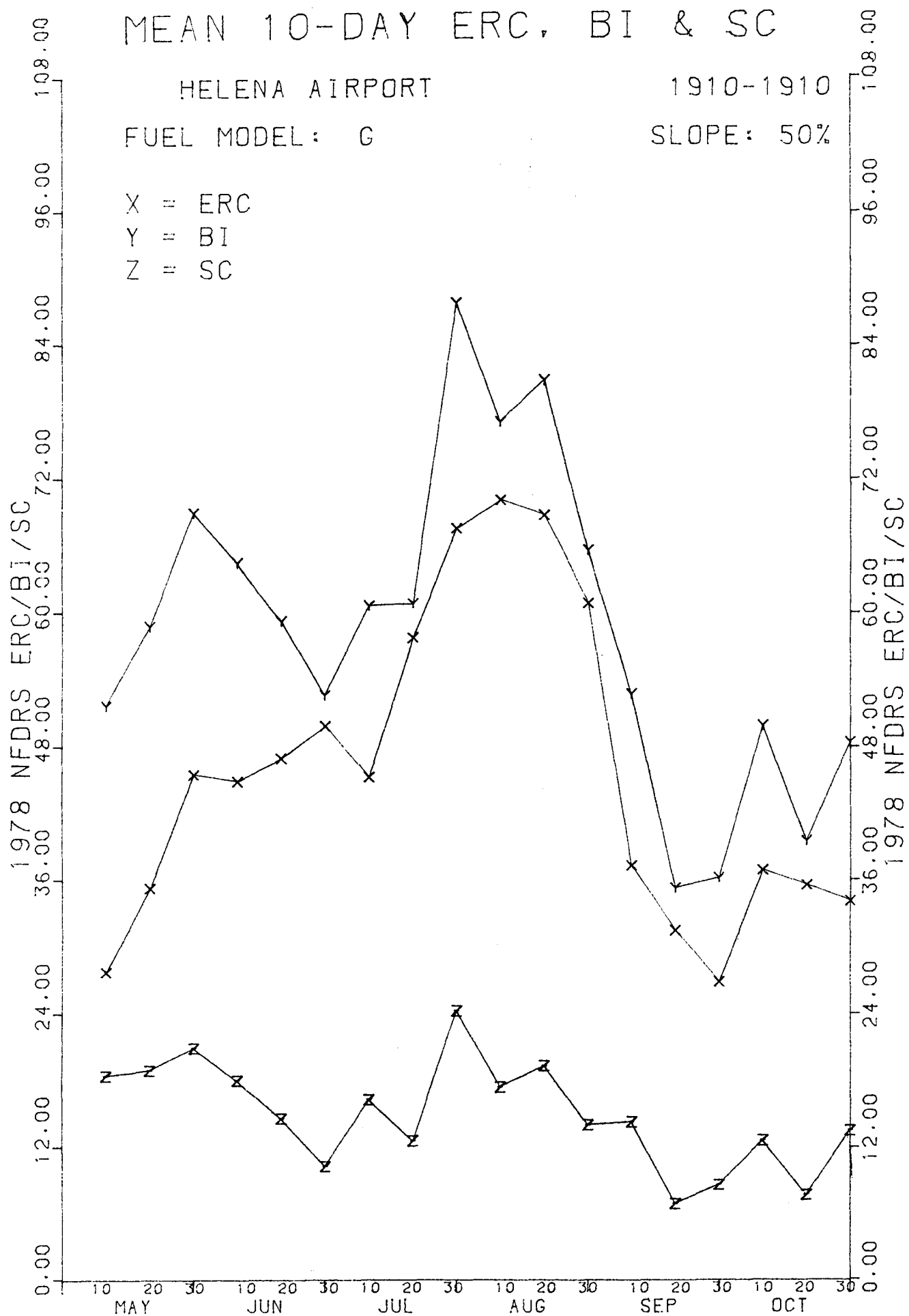
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1914-1914

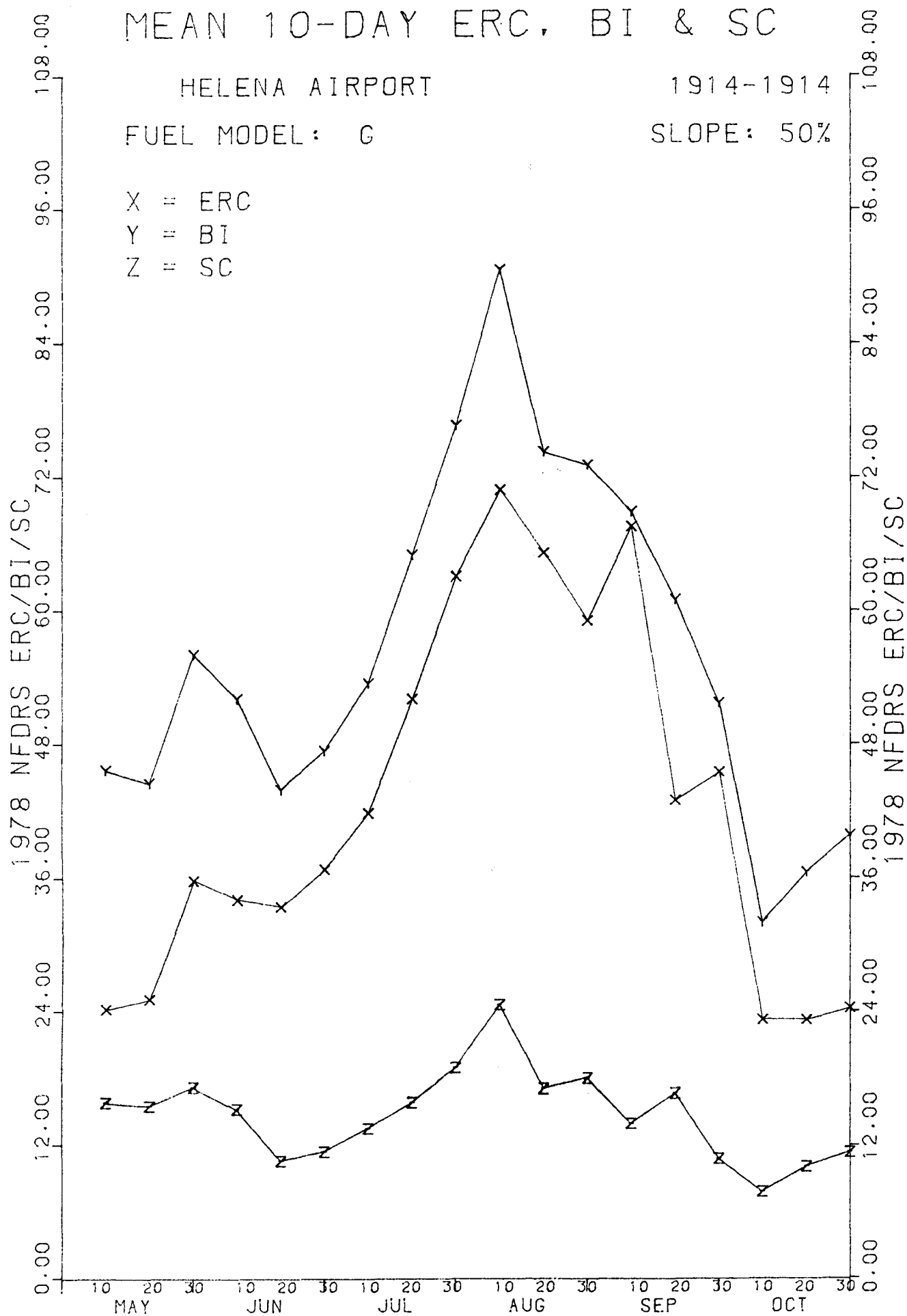
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1917-1917

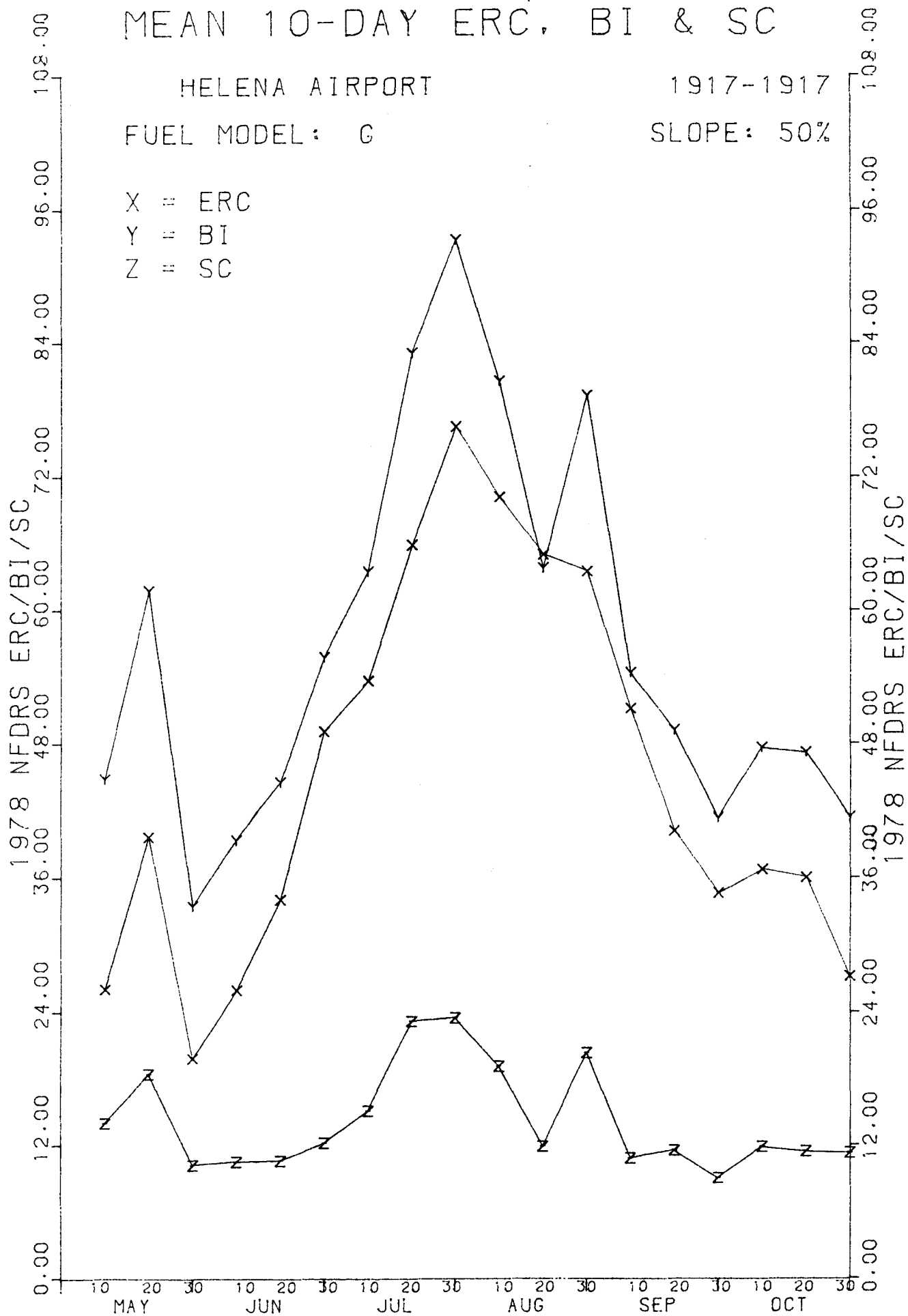
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1918-1918

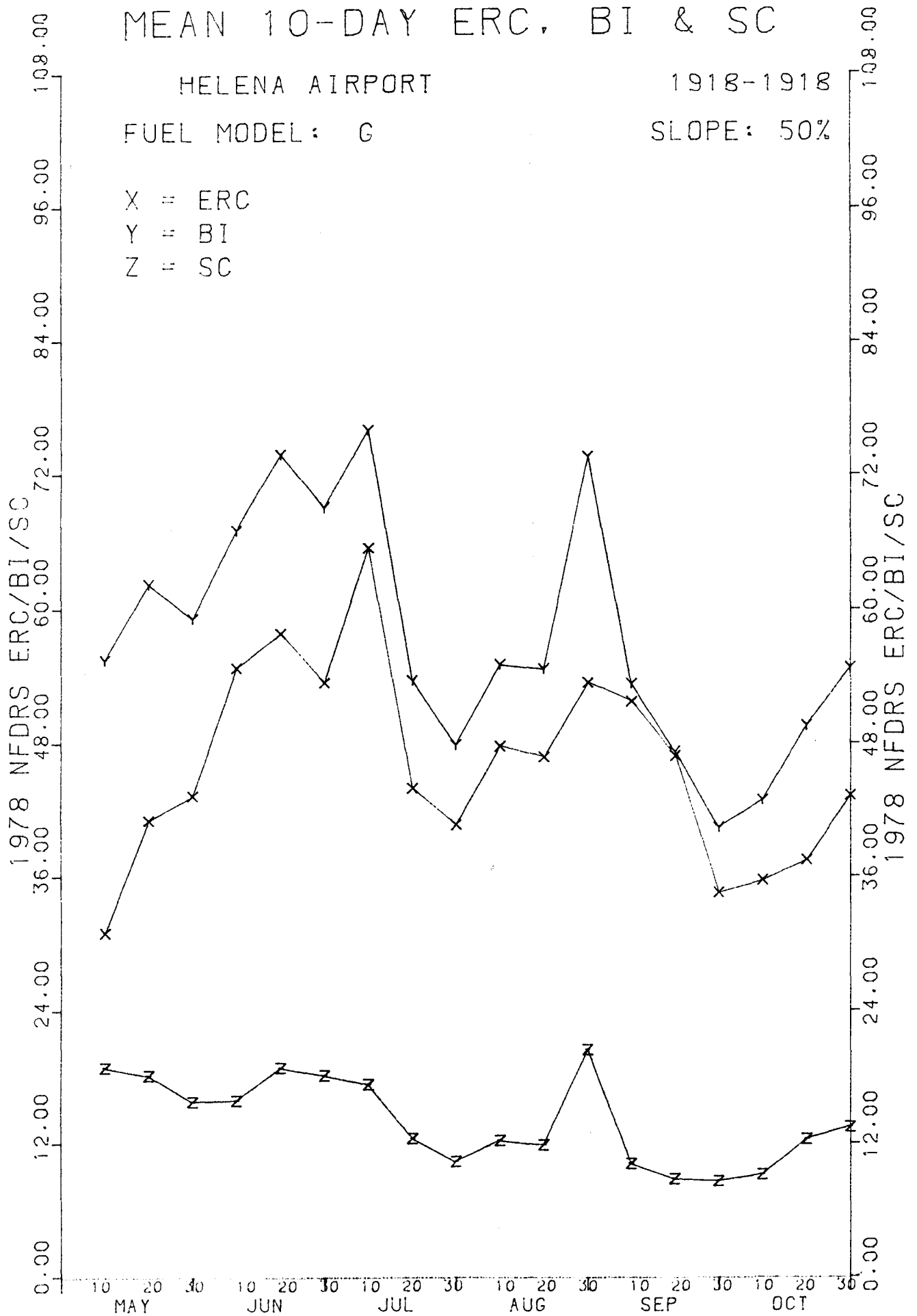
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

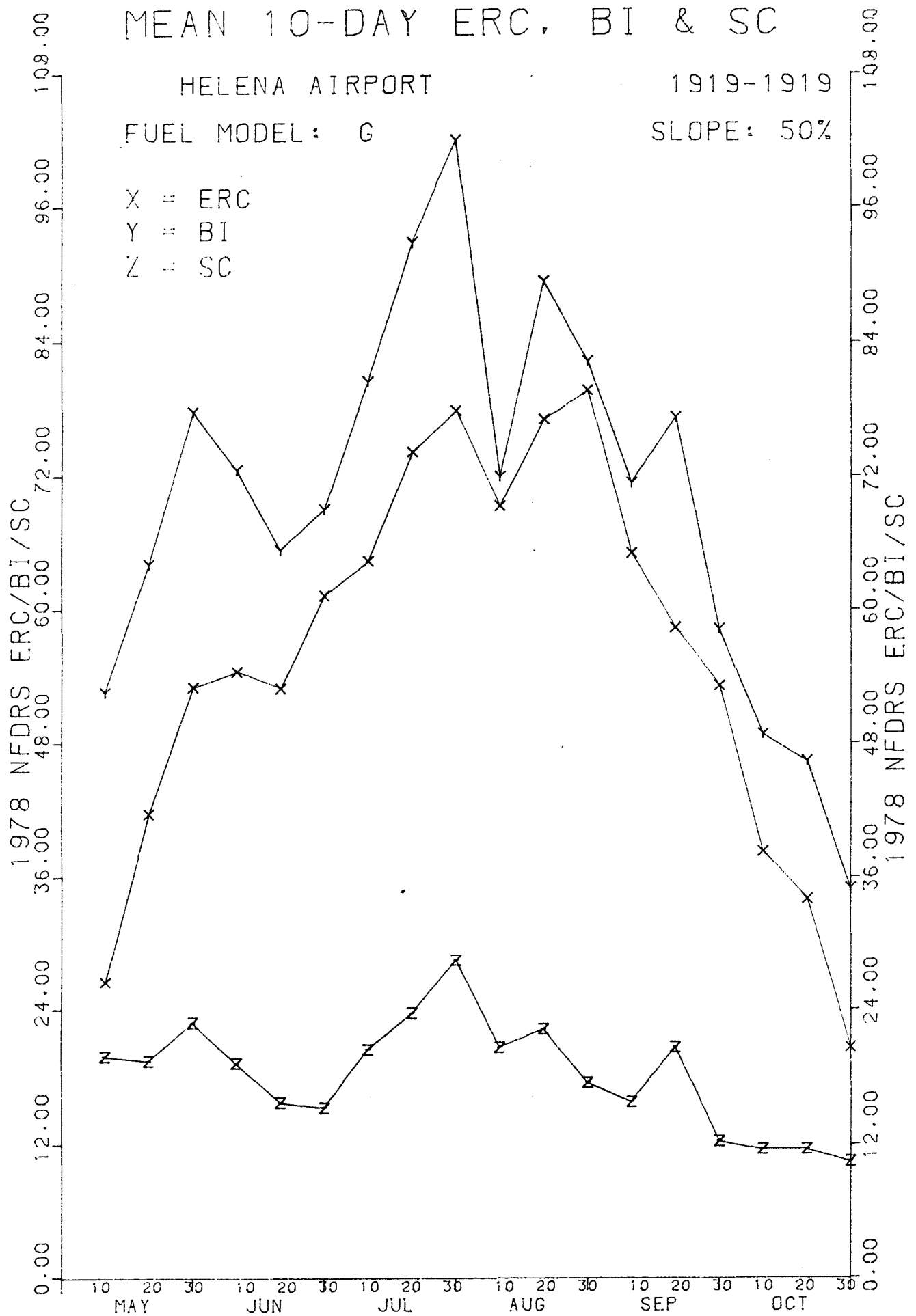
HELENA AIRPORT

1919-1919

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1920-1920

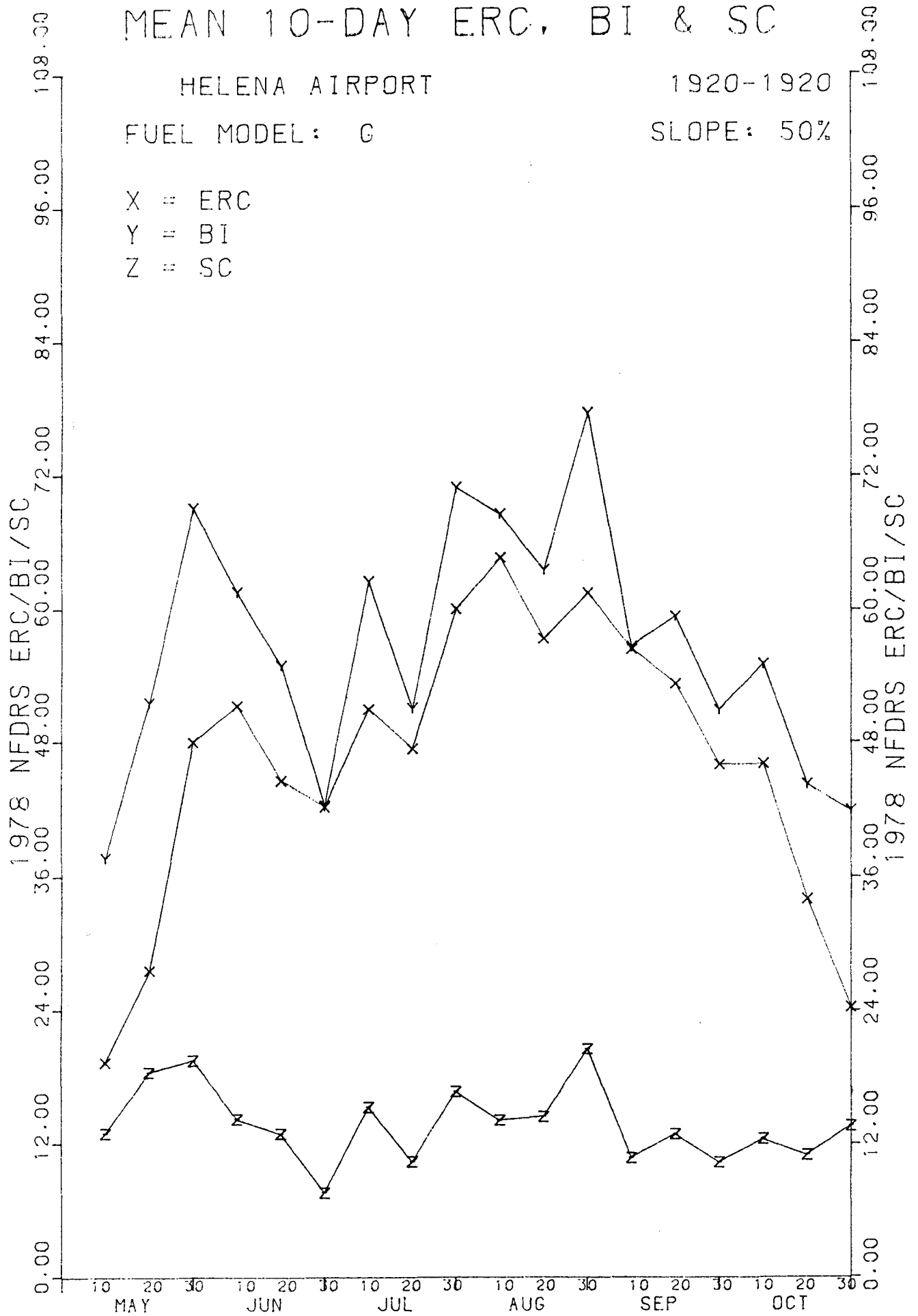
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1925-1925

FUEL MODEL: G

SLOPE: 50%

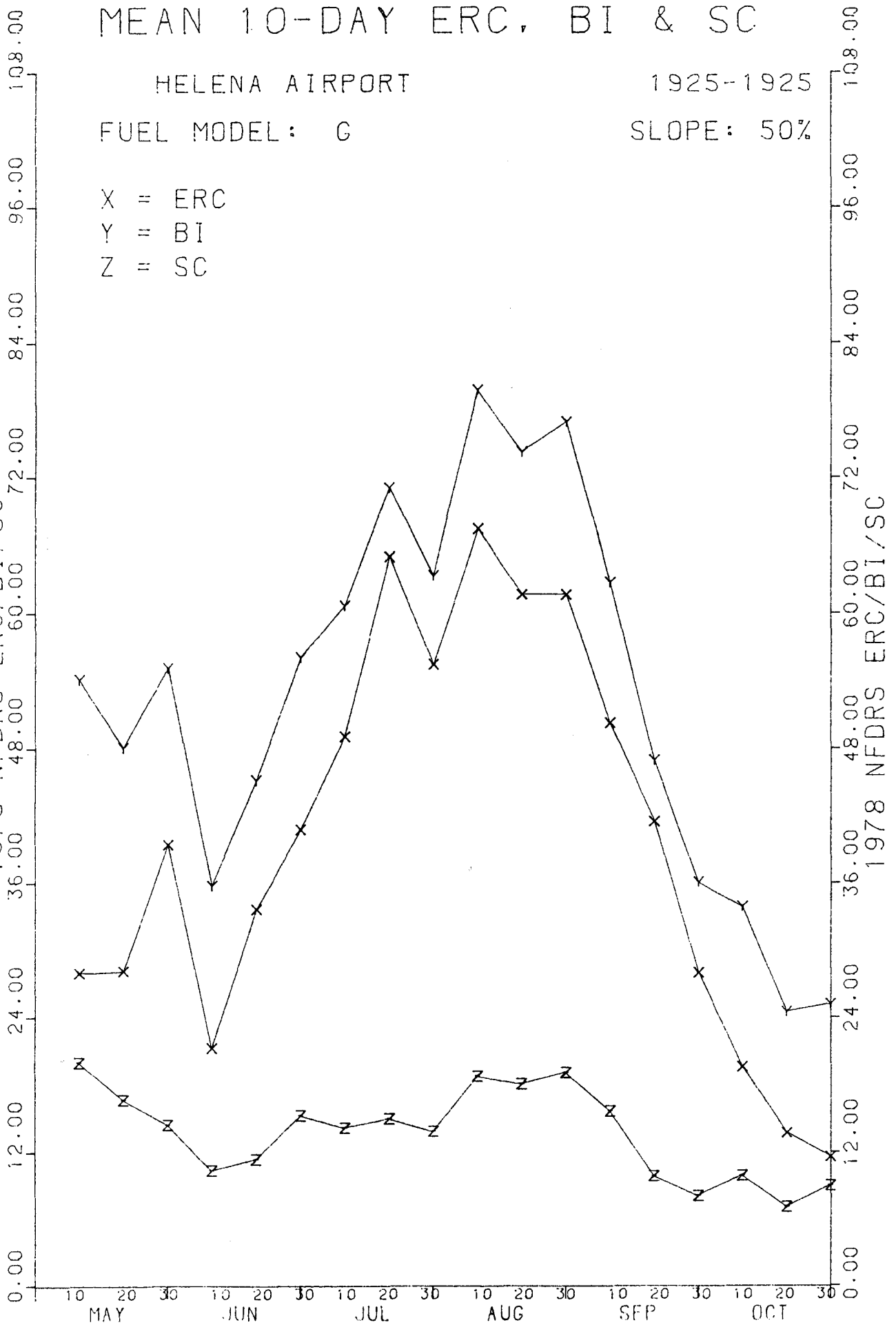
X = ERC

Y = BI

Z = SC

1978 NFDERS ERC/BI/SC

1978 NFDERS ERC/BI/SC



MEAN 10-DAY ERC. BI & SC

HELENA AIRPORT

1926-1926

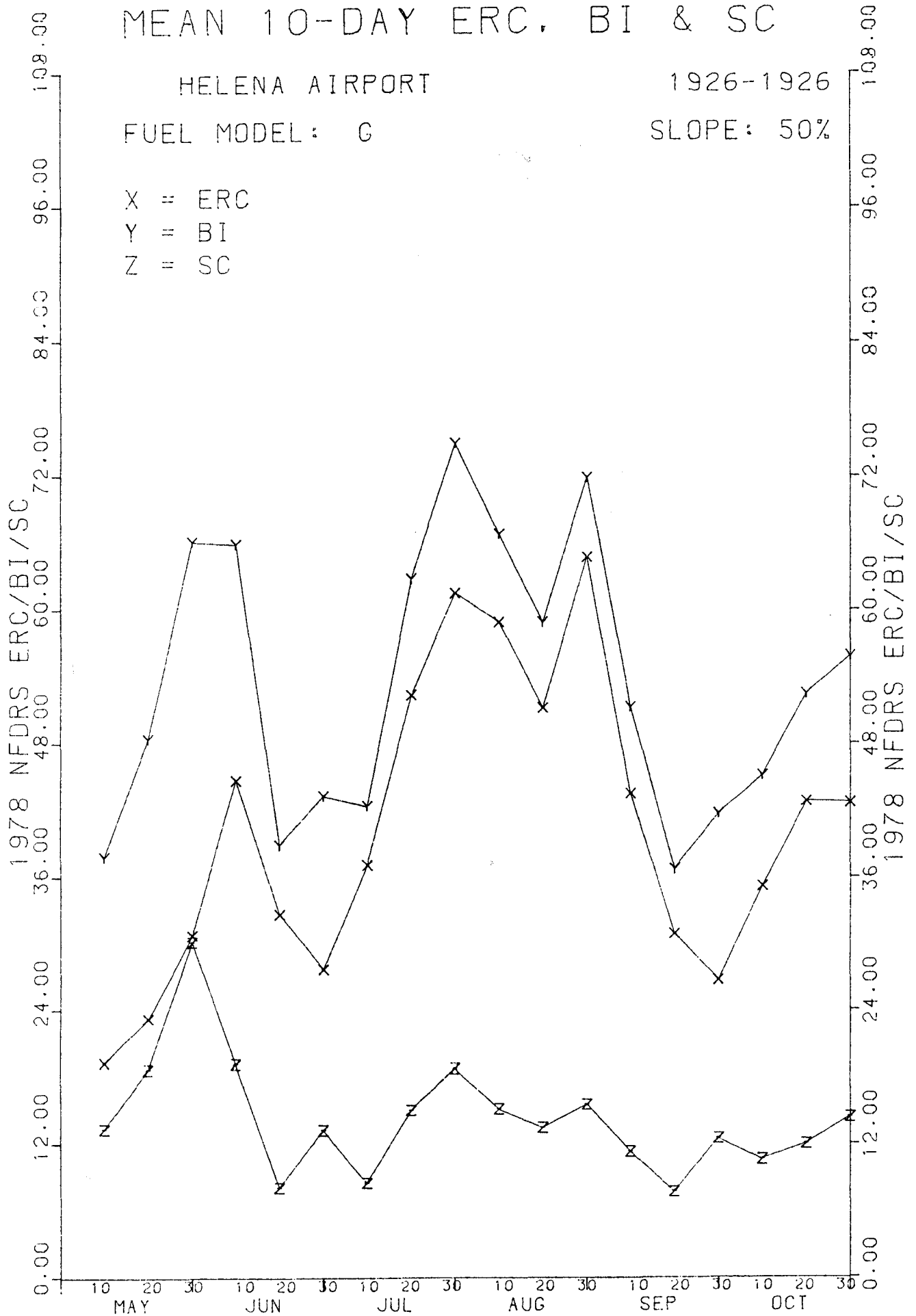
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1929-1929

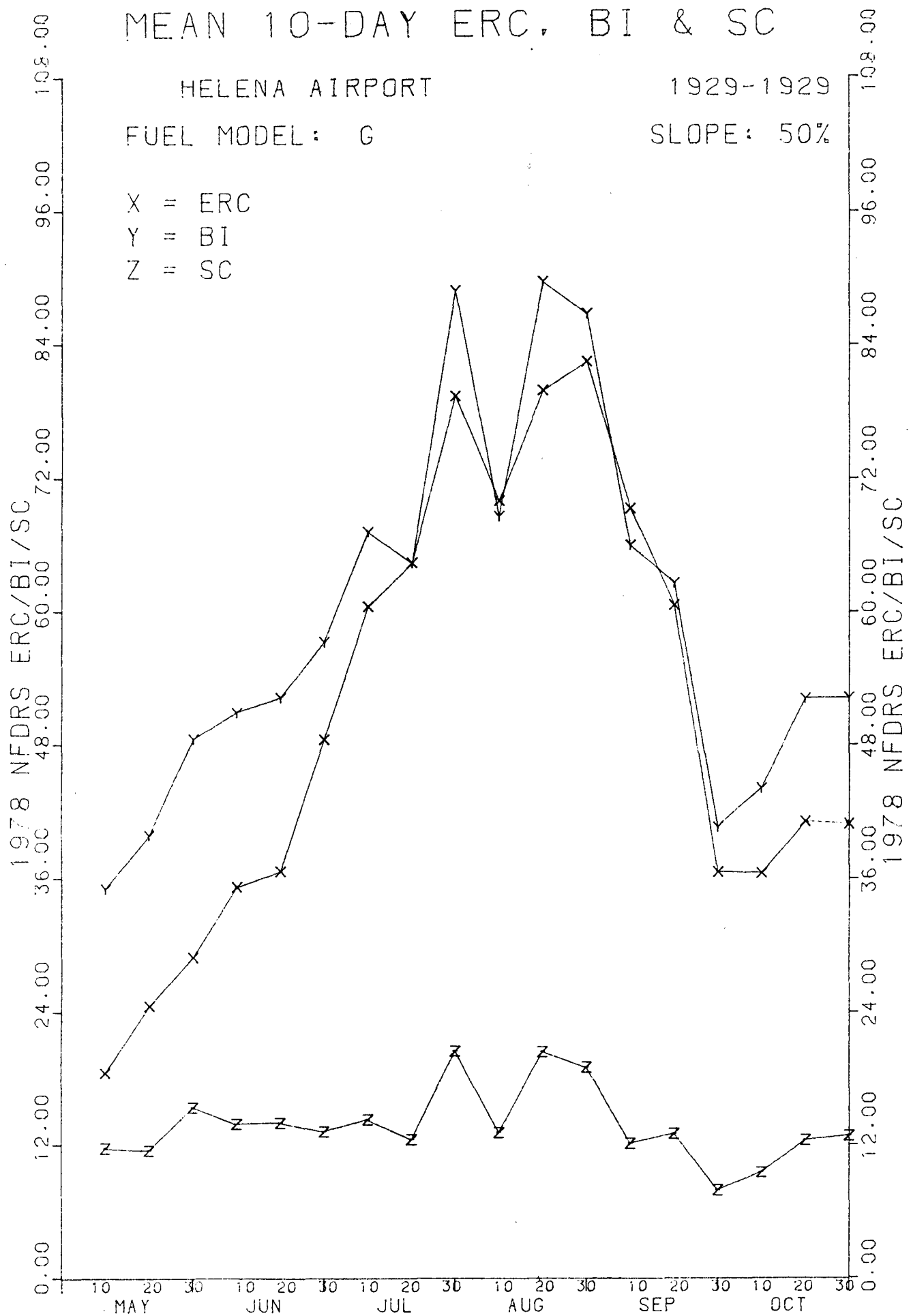
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1931-1931

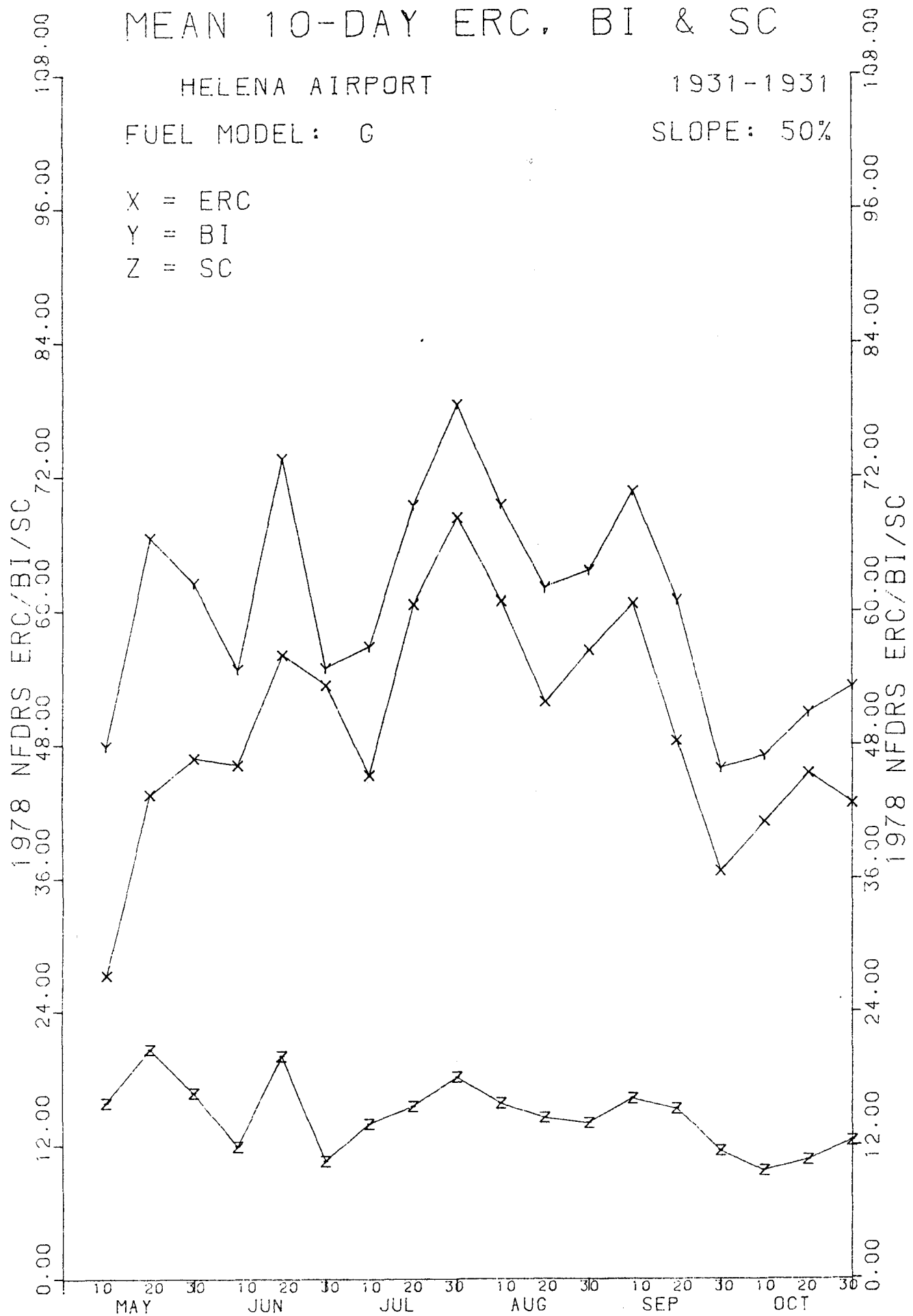
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1934-1934

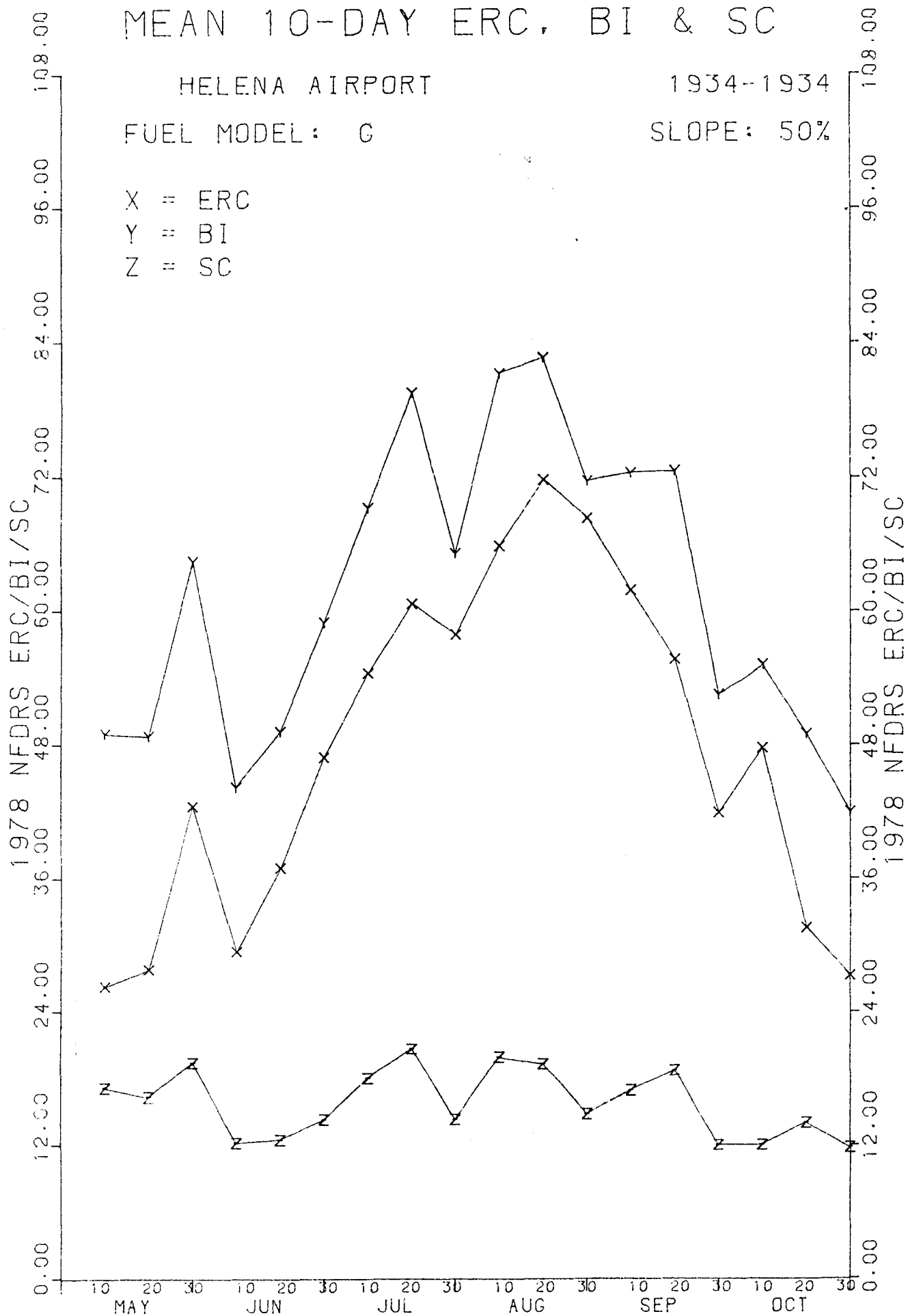
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1960-1960

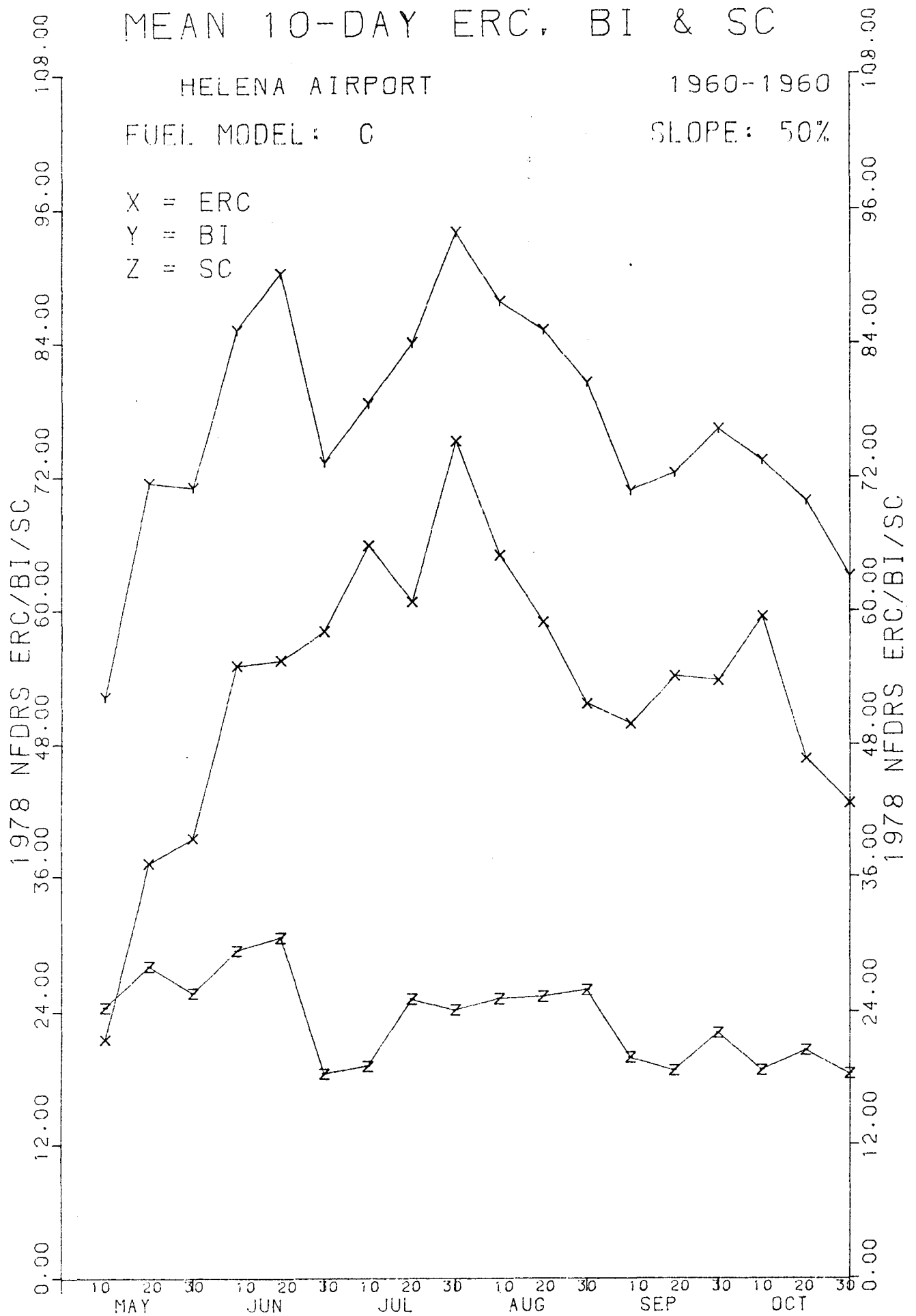
FUEL MODEL: C

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1961-1961

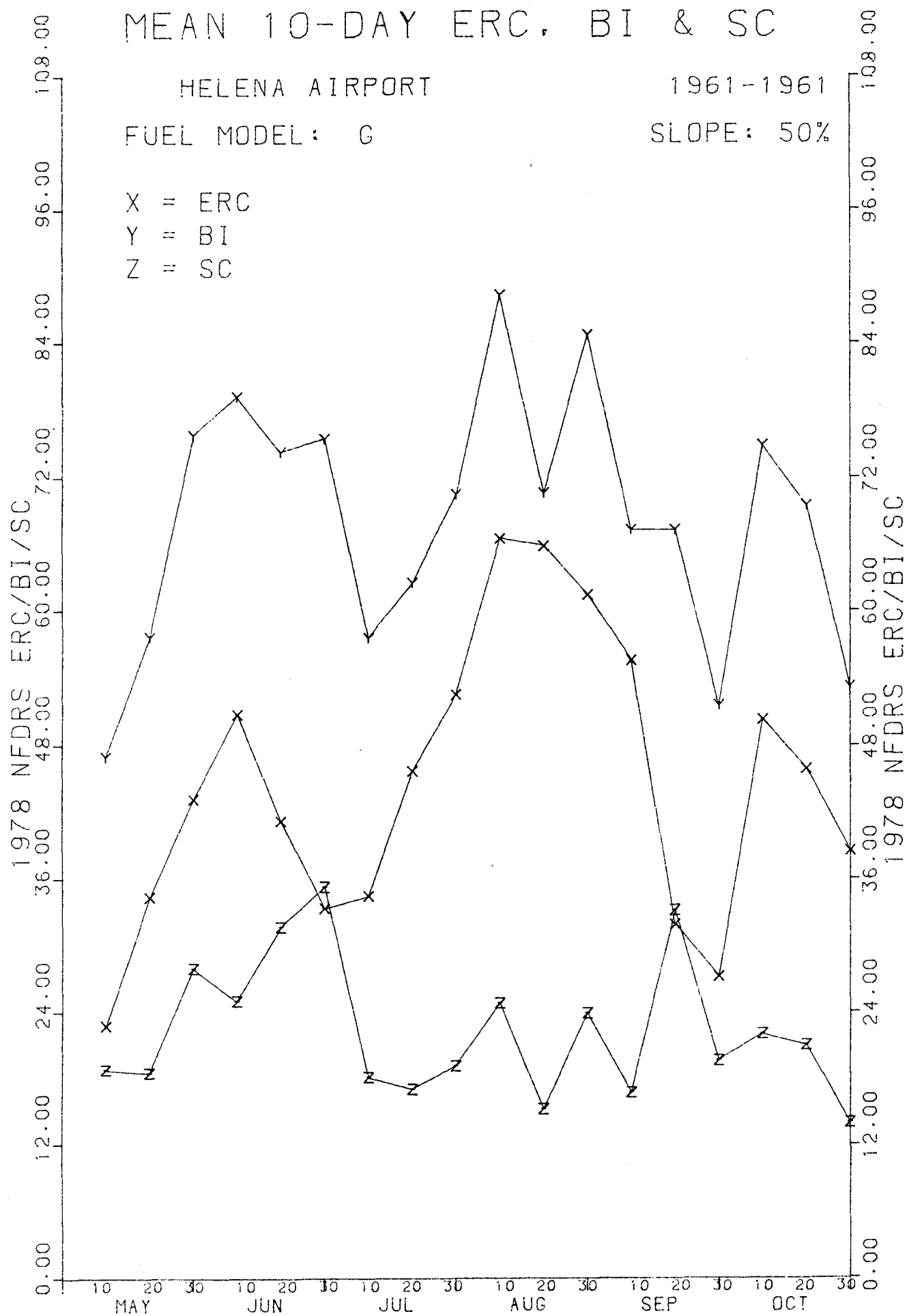
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

HELENA AIRPORT

1967-1967

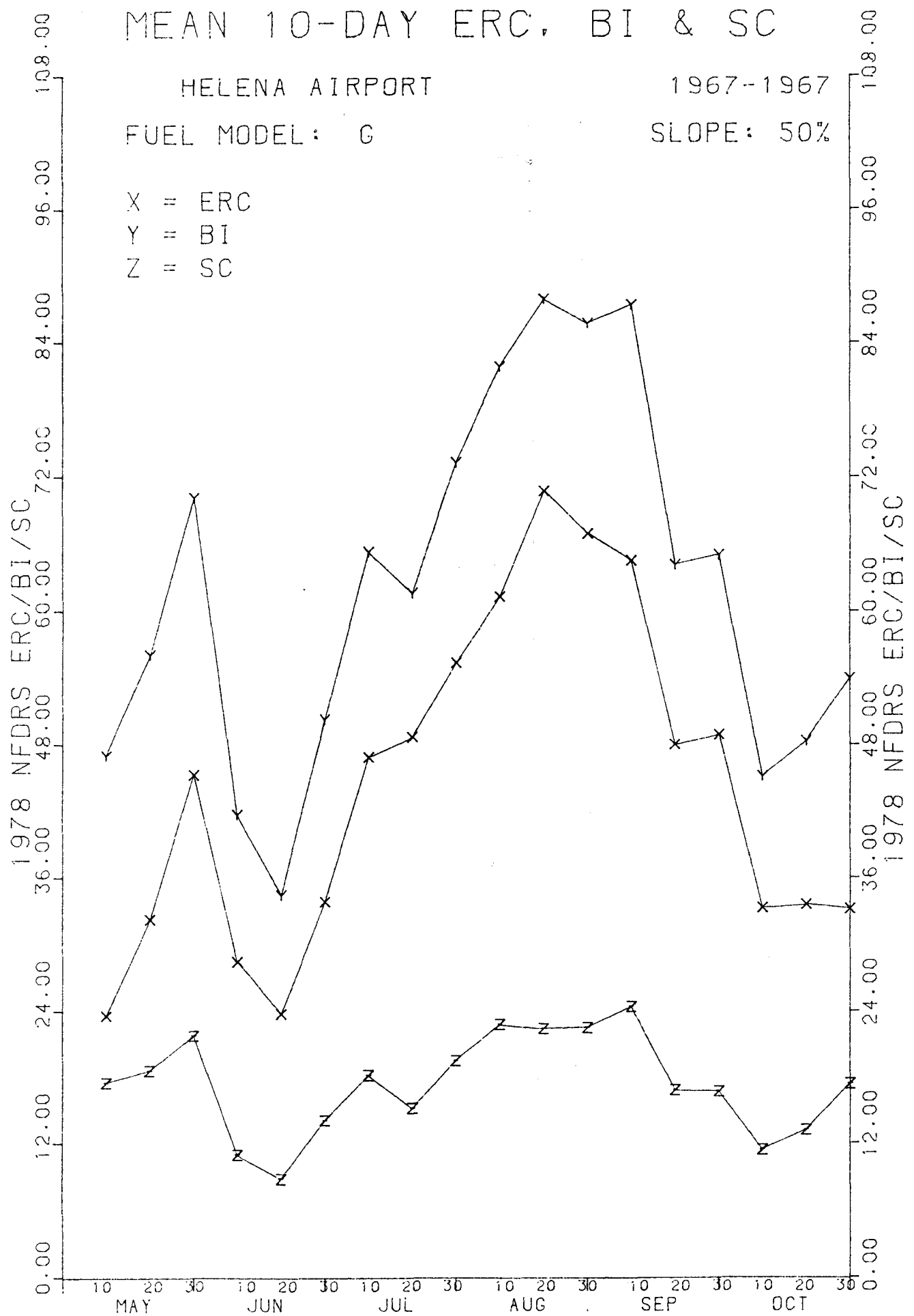
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC. BI & SC

HELENA AIRPORT

1910-1967

FUEL MODEL: G

SLOPE: 50%

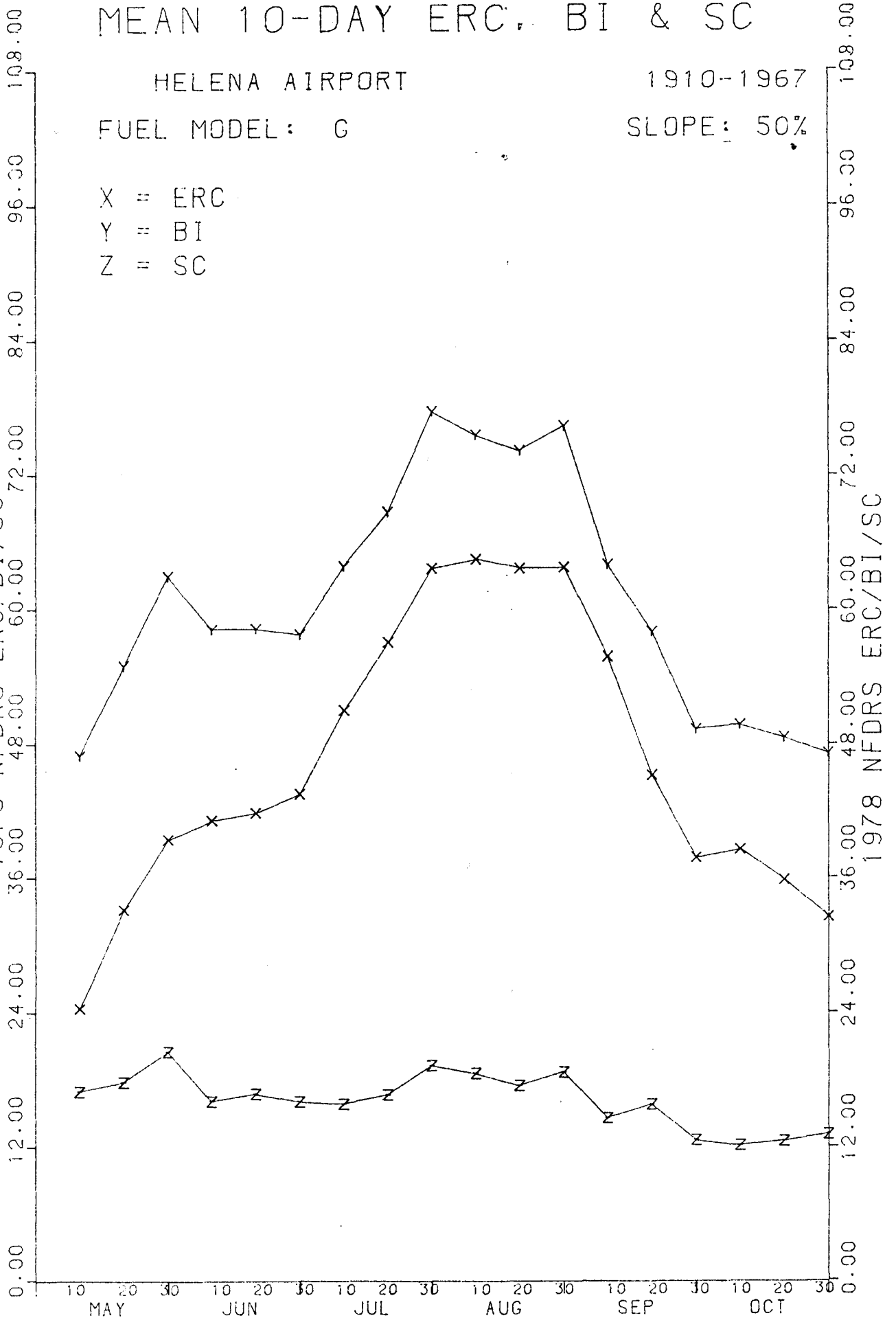
X = ERC

Y = BI

Z = SC

1978 NFDRS ERC/BI/SC

1978 NFDRS ERC/BI/SC



Appendix B

Yearly Seasonal Plots of ERC, BI, and SC at Kaldispell

1910

1914

1917

1918

1919

1920

1925

1926

1931

1934

1967

1910-1967

MEAN 10-DAY ERC, BI & SC

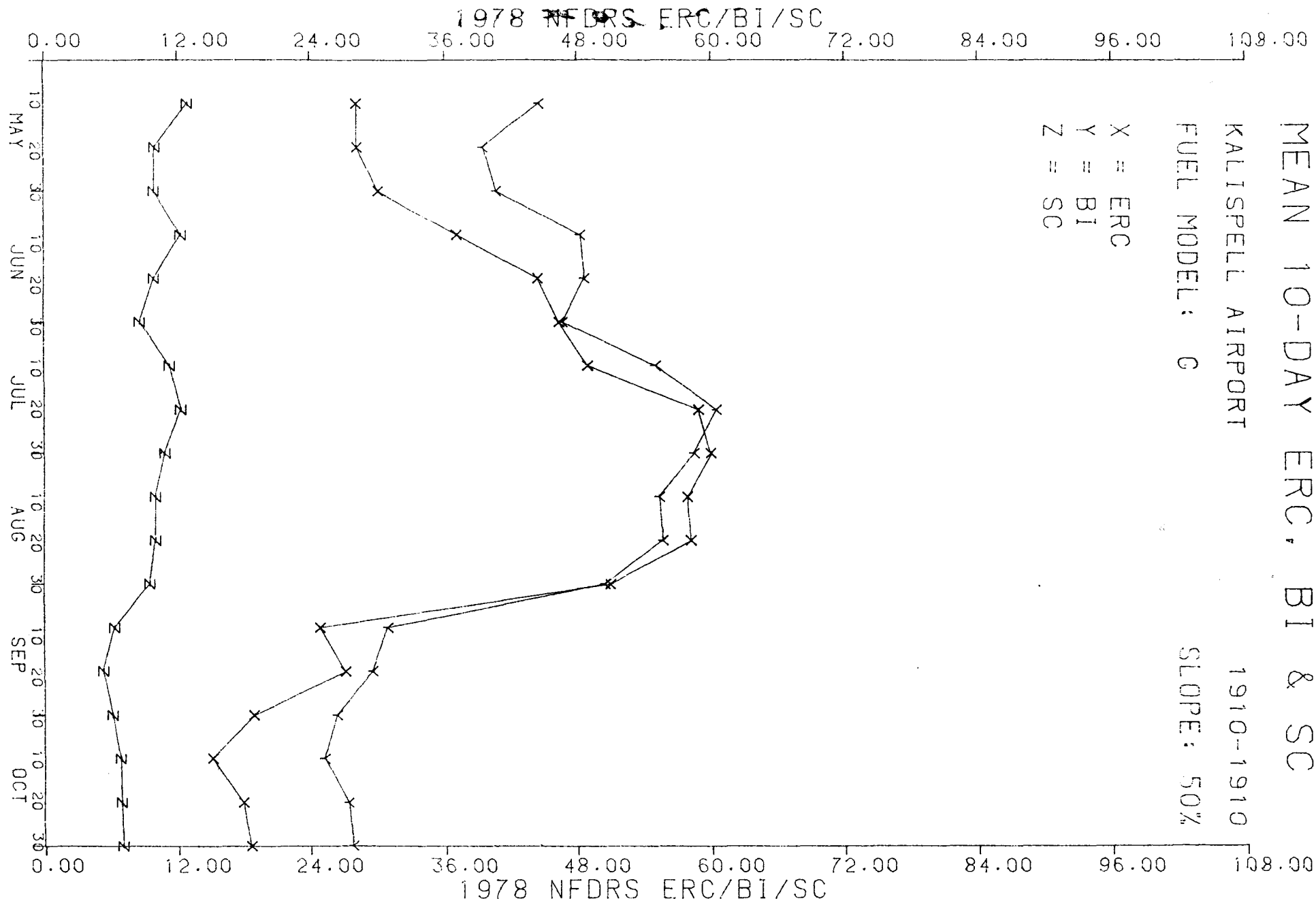
KALISPELL AIRPORT

1910-1910

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC



MEAN 10-DAY ERC, BI & SC

KALISPELL AIRPORT

1914-1914

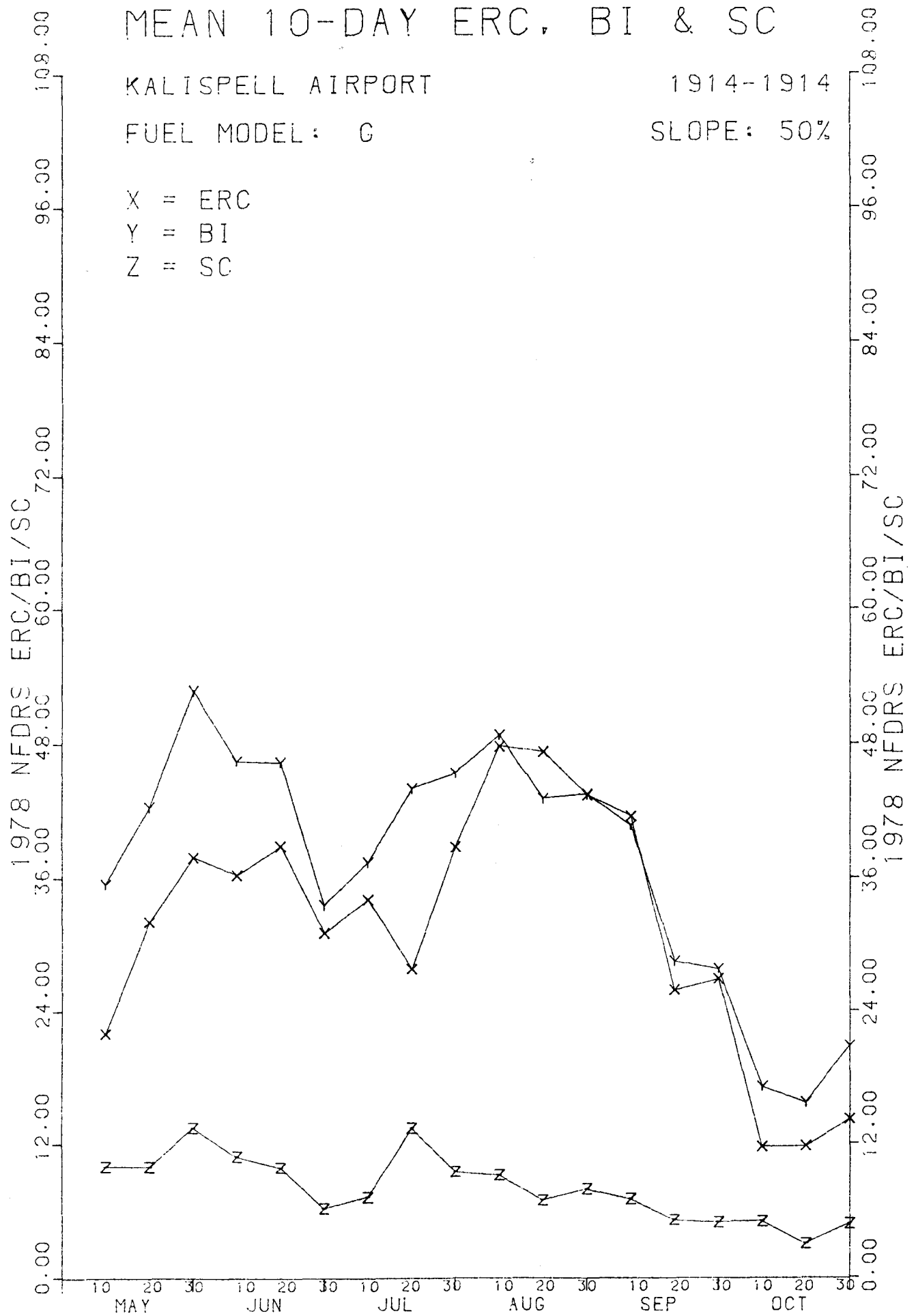
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

KALISPELL AIRPORT

1917-1917

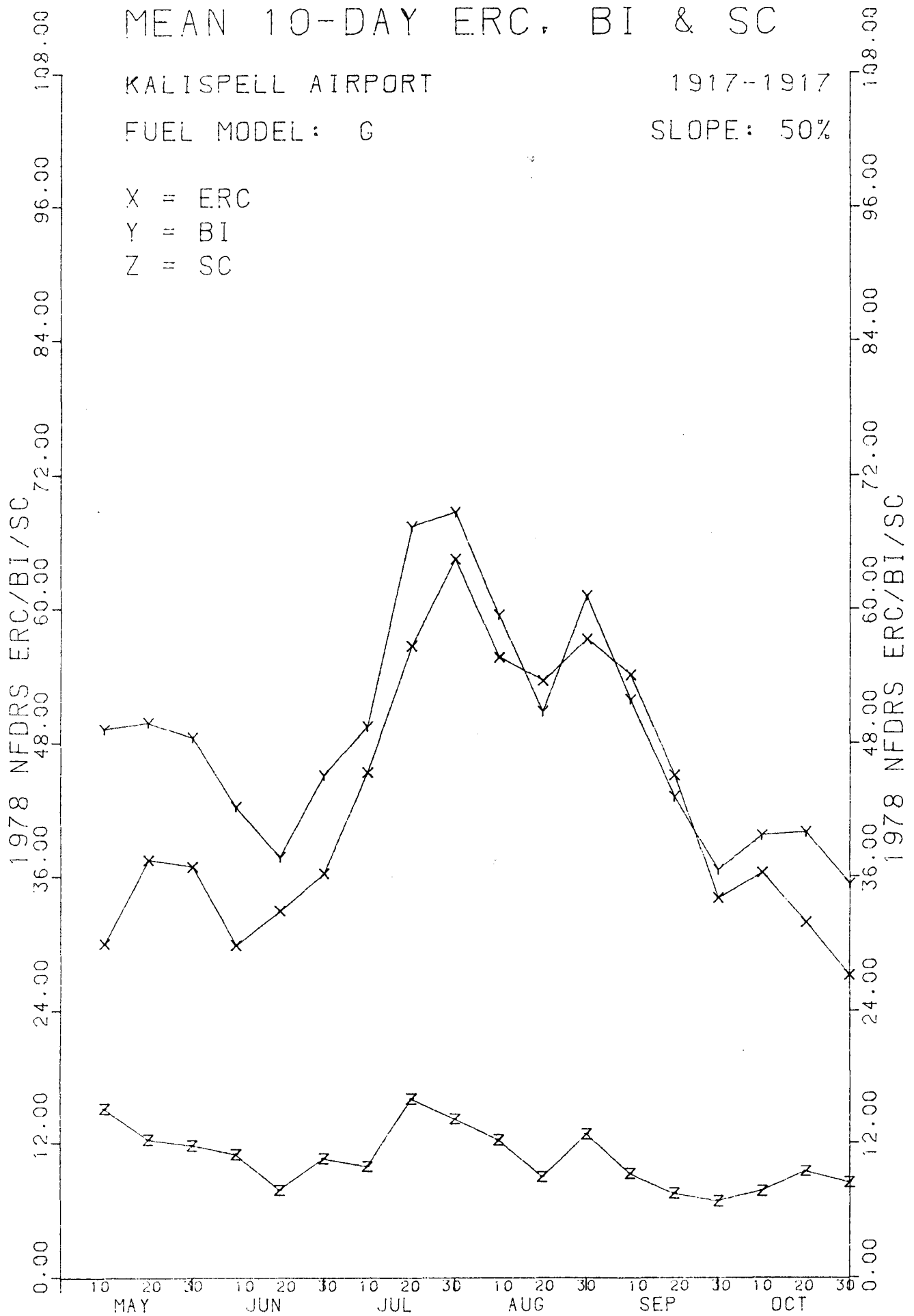
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

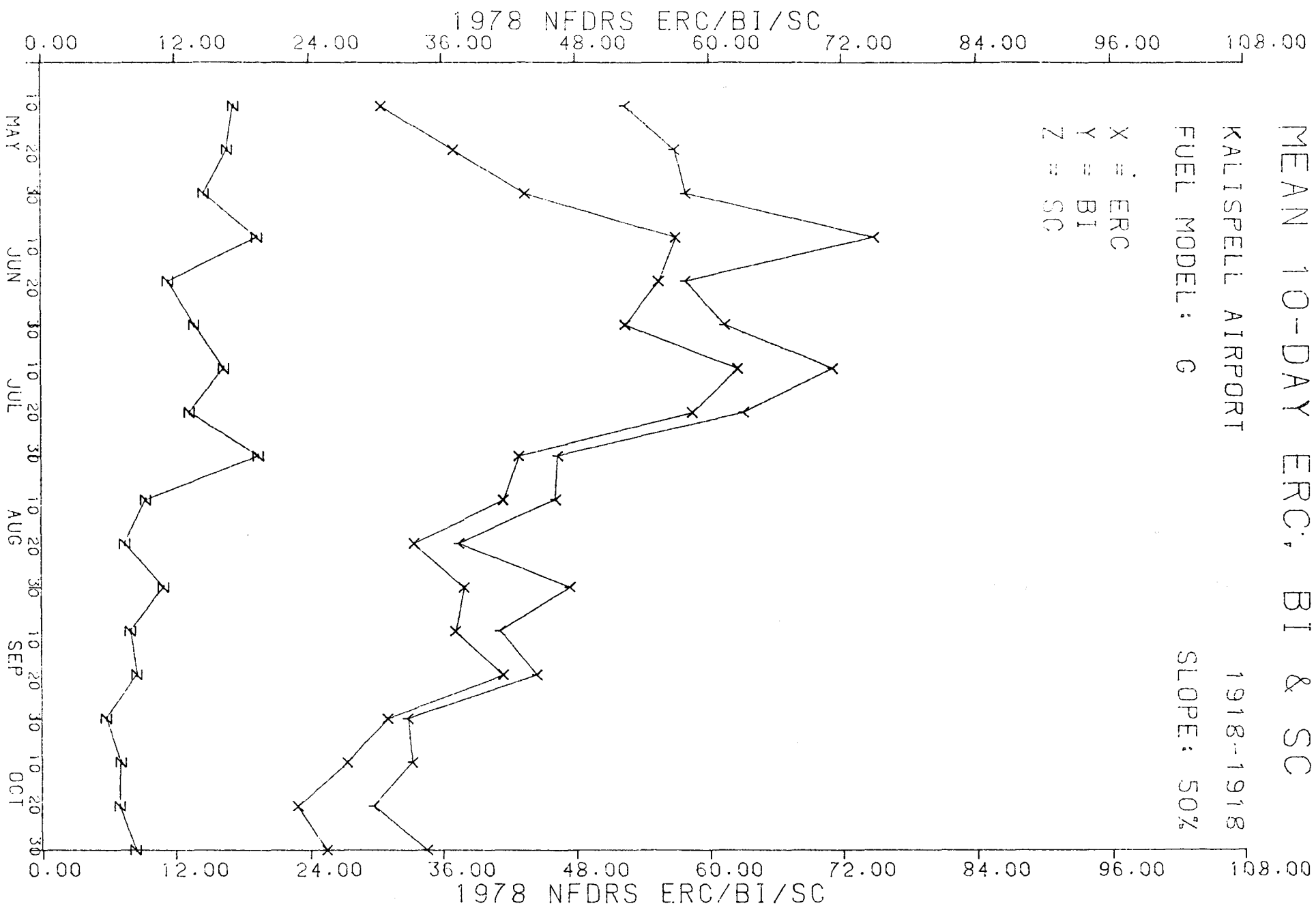
KALISPELL AIRPORT

1918-1918

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC



MEAN 10-DAY ERC, BI & SC

KALISPELL AIRPORT

1919-1919

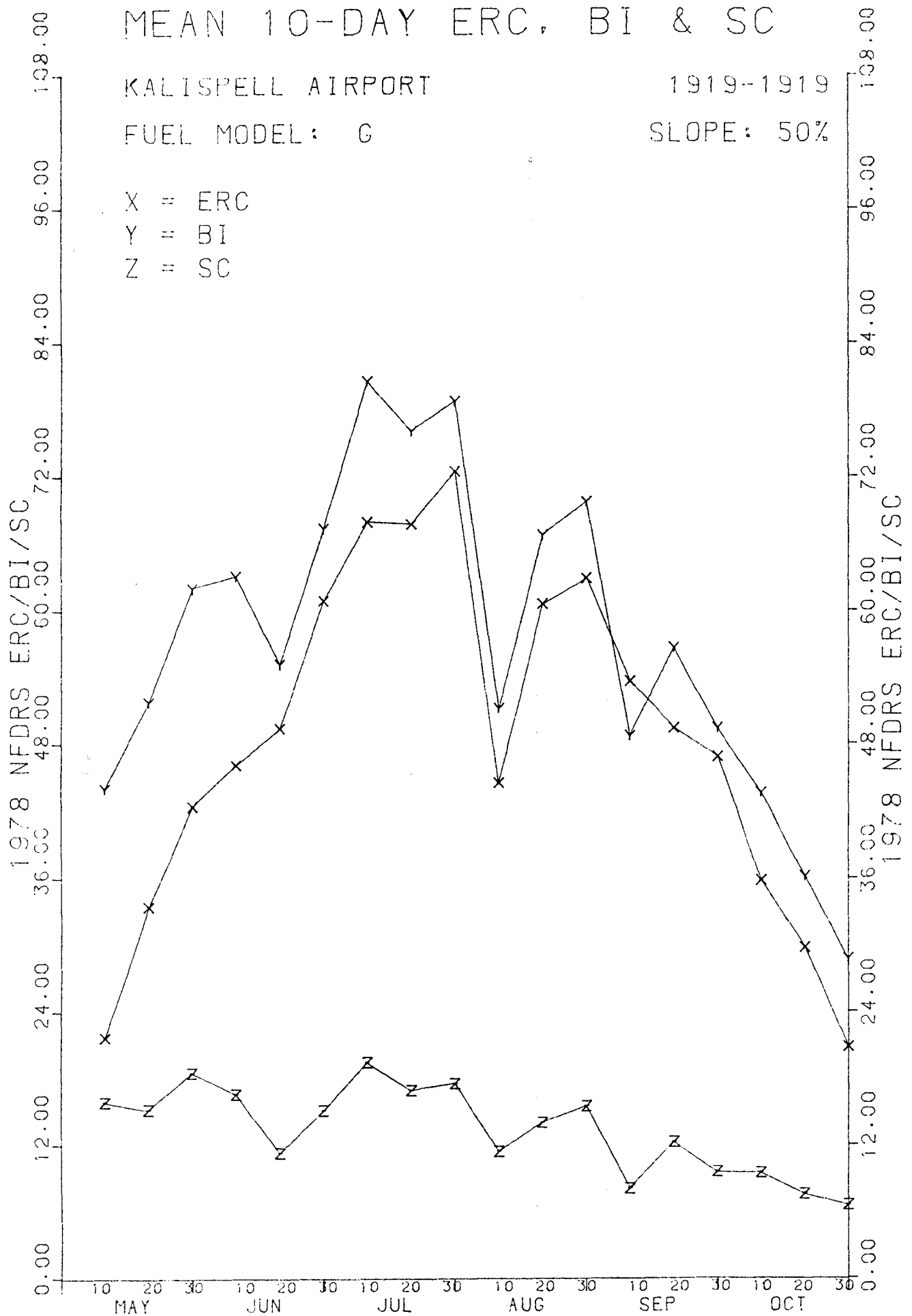
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

KALISPELL AIRPORT

1920-1920

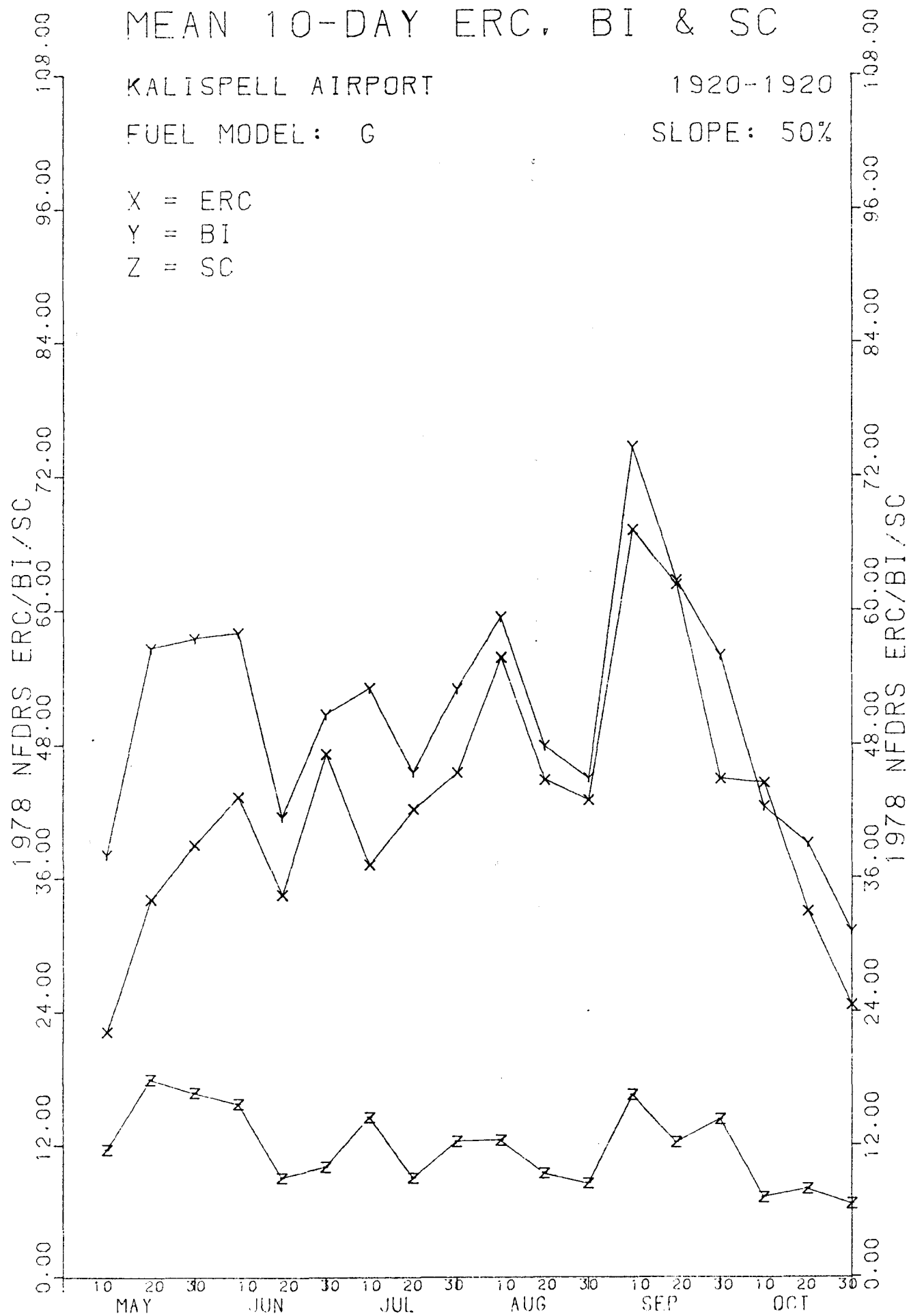
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

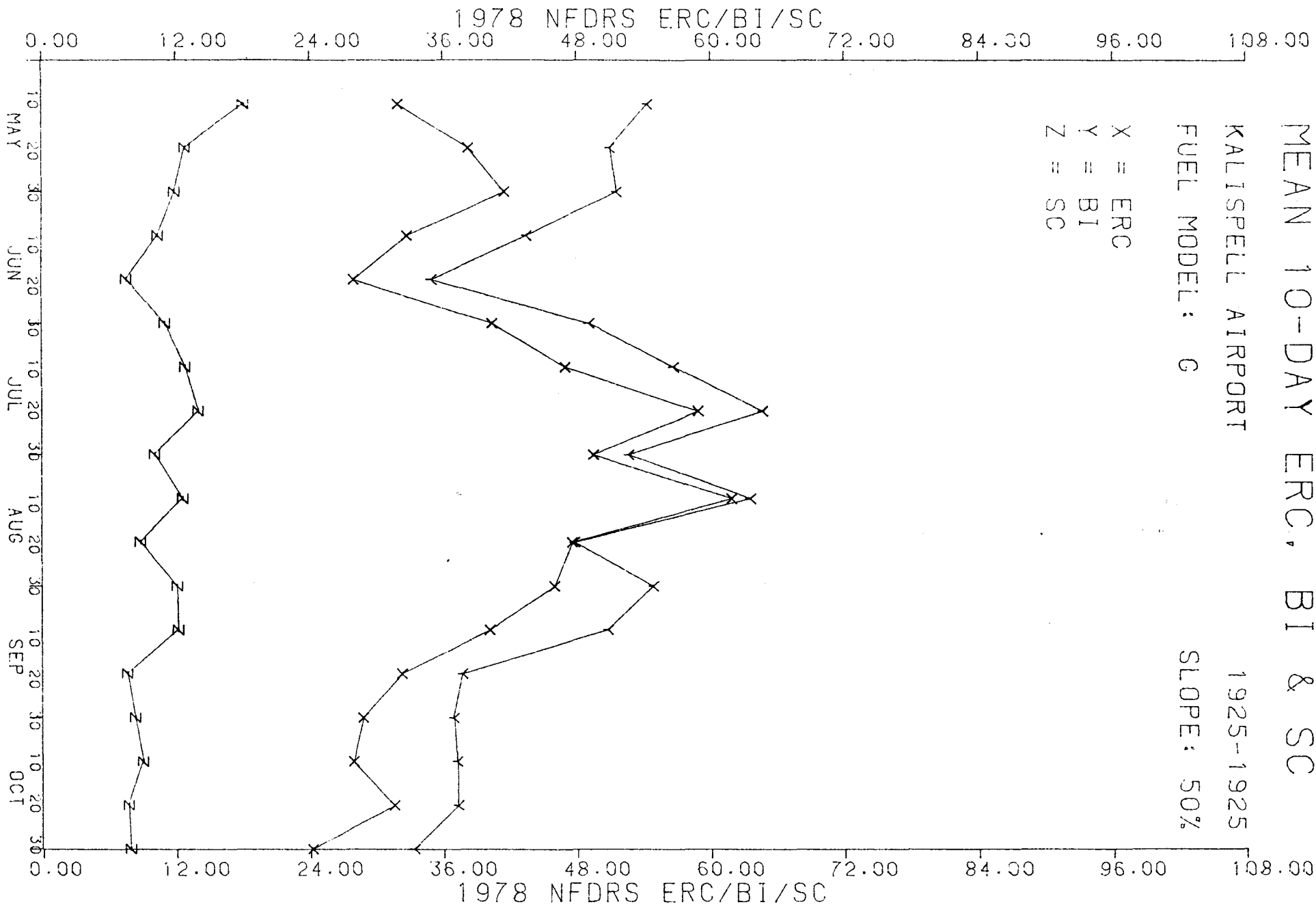
KALISPELL AIRPORT

1925-1925

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC



MEAN 10-DAY ERC, BI & SC

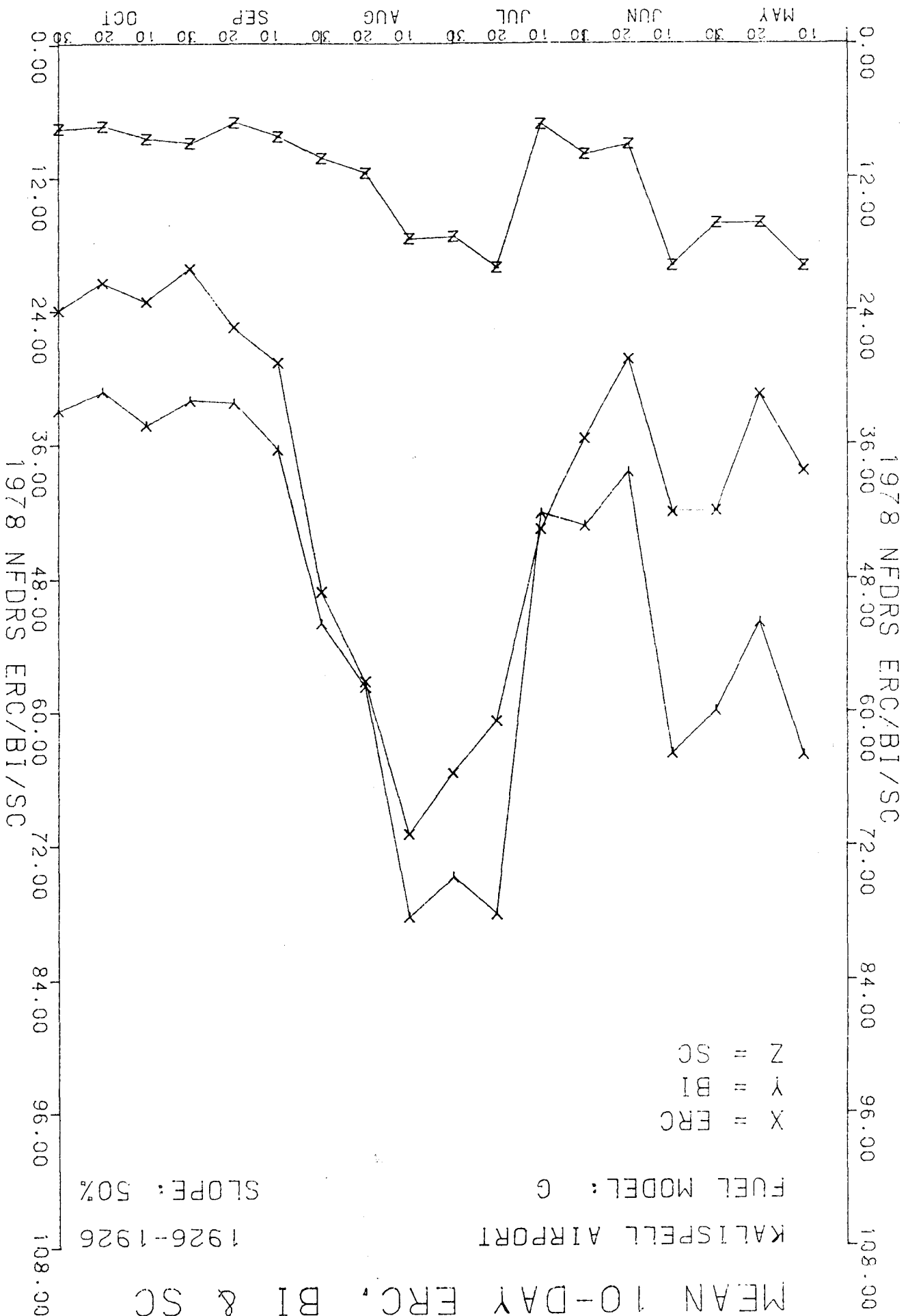
KALISPELL AIRPORT

FUEL MODEL: G

SLOPE: 50%

1926-1926

X = ERC
Y = BI
Z = SC



MEAN 10-DAY ERC, BI & SC

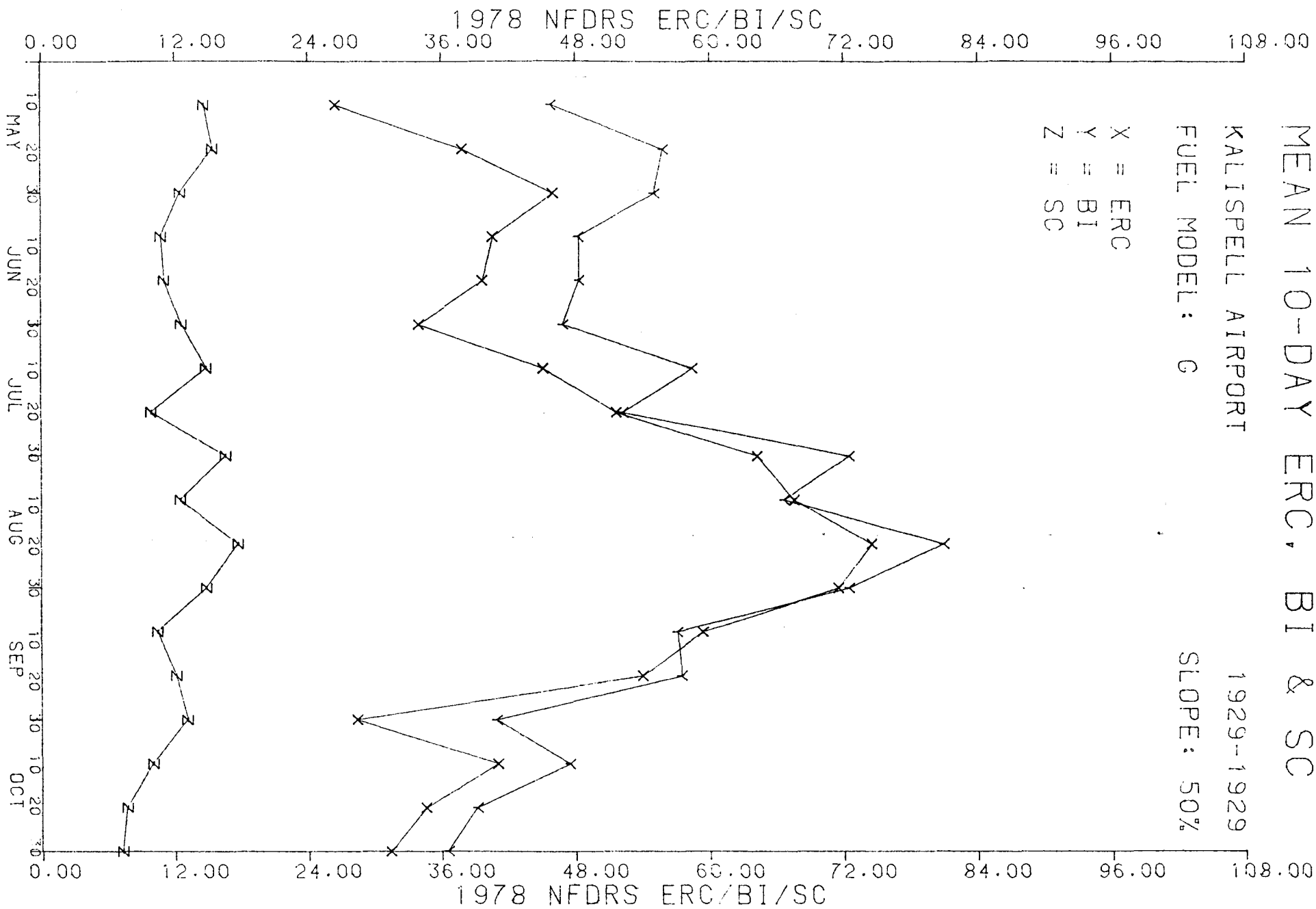
KALISPELL AIRPORT

1929-1929

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC



MEAN 10-DAY ERC, BI & SC

KALISPELL AIRPORT

1931-1931

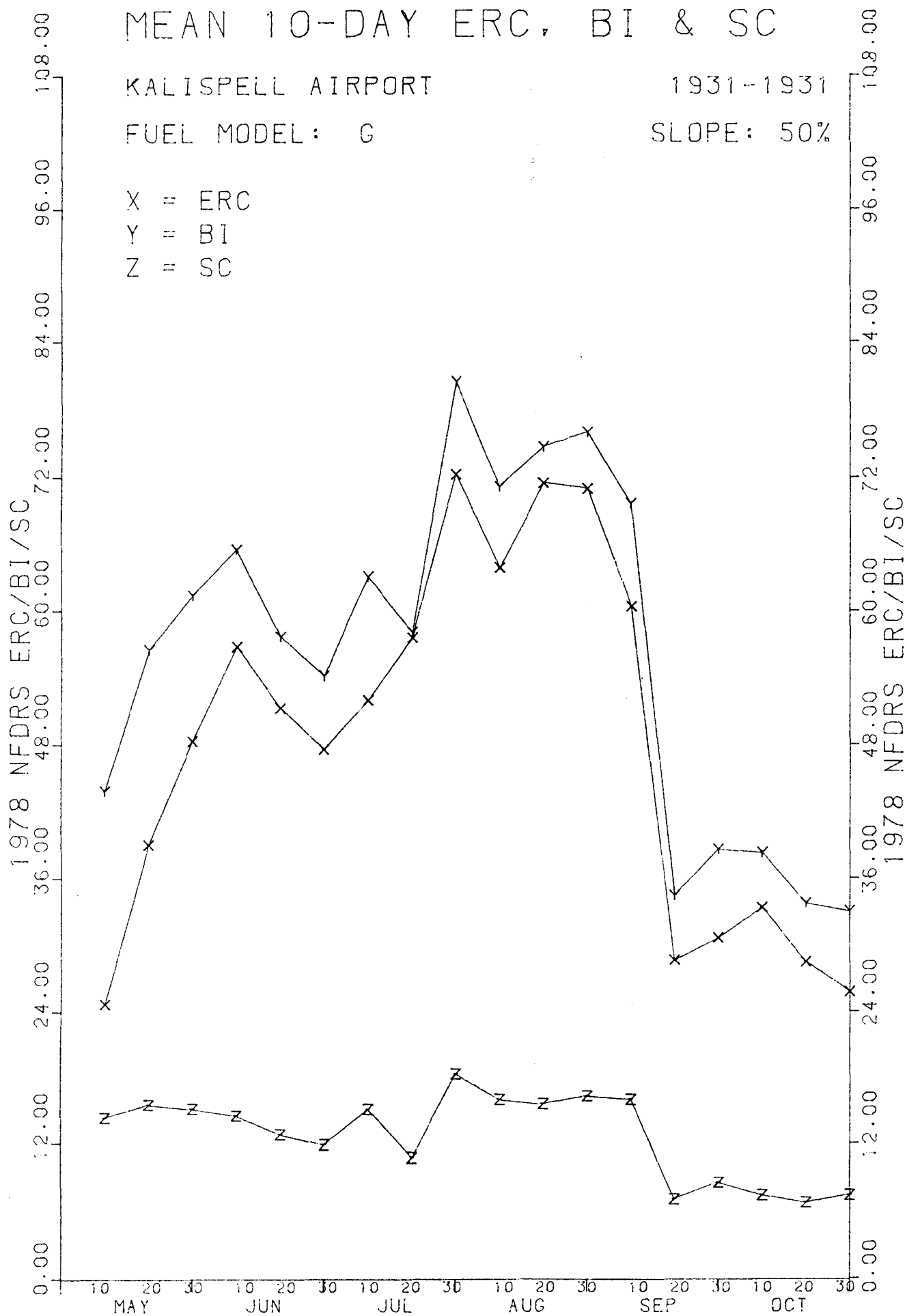
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

KALISPELL AIRPORT

1934-1934

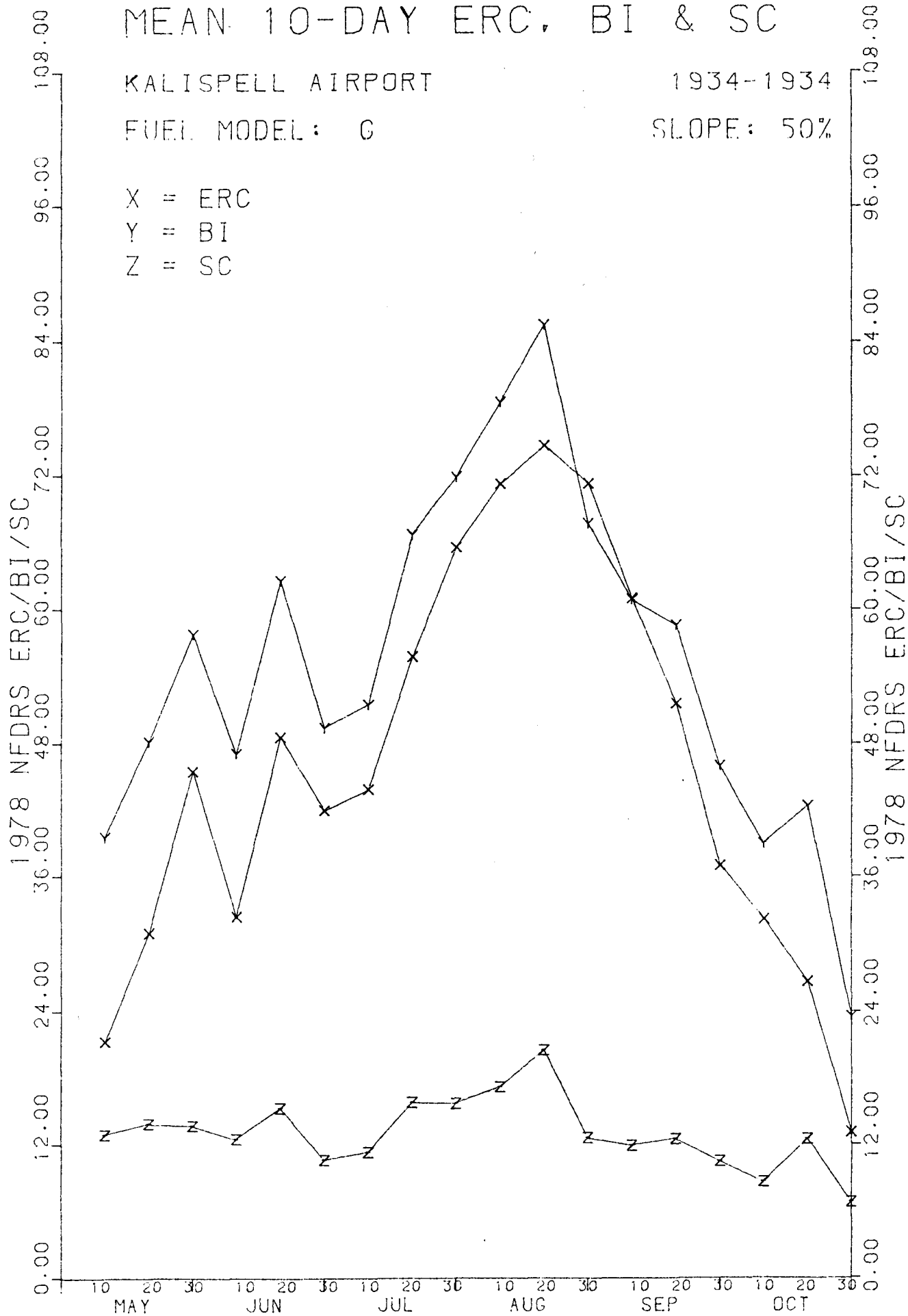
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

KALISPELL AIRPORT

1967-1967

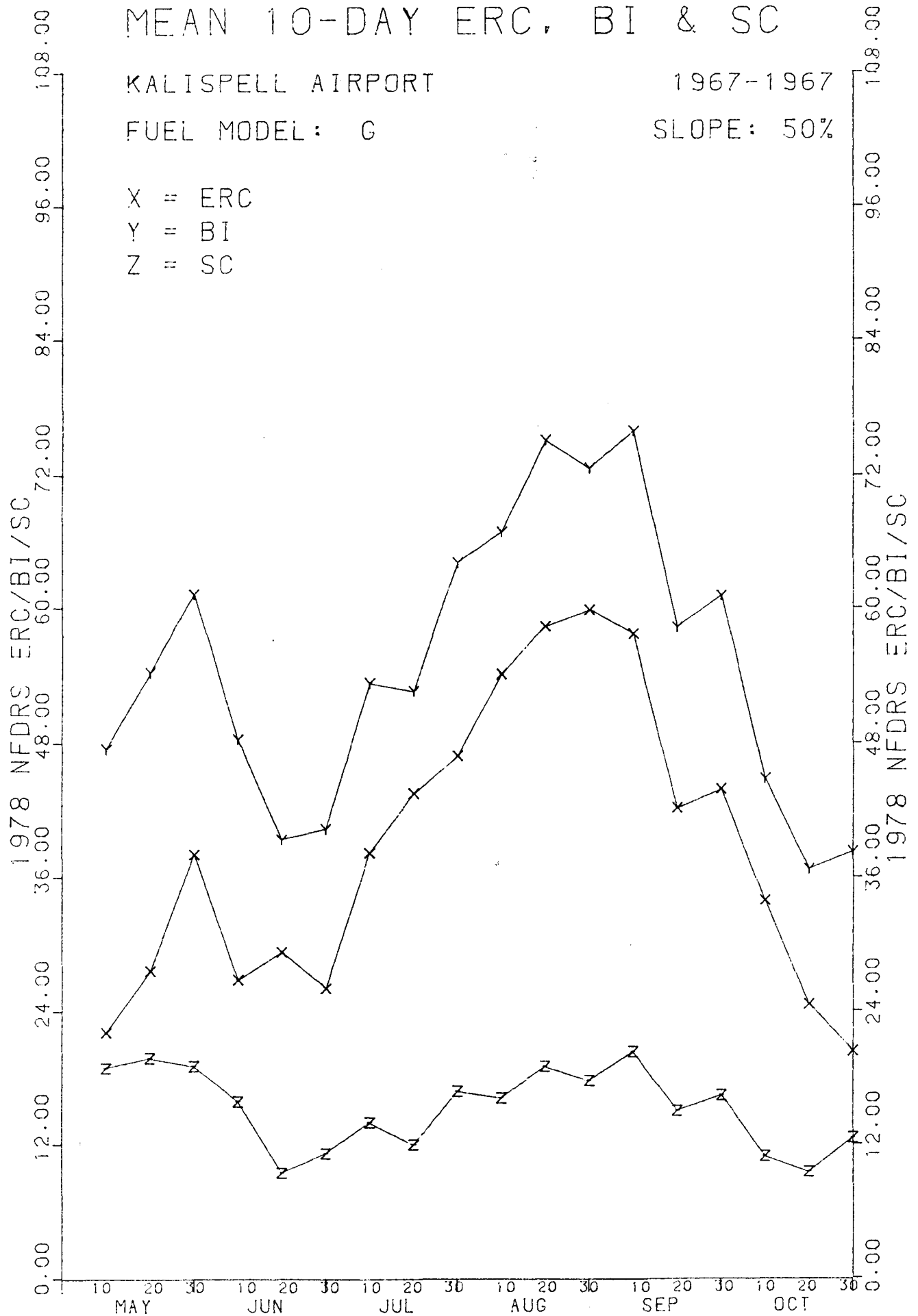
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

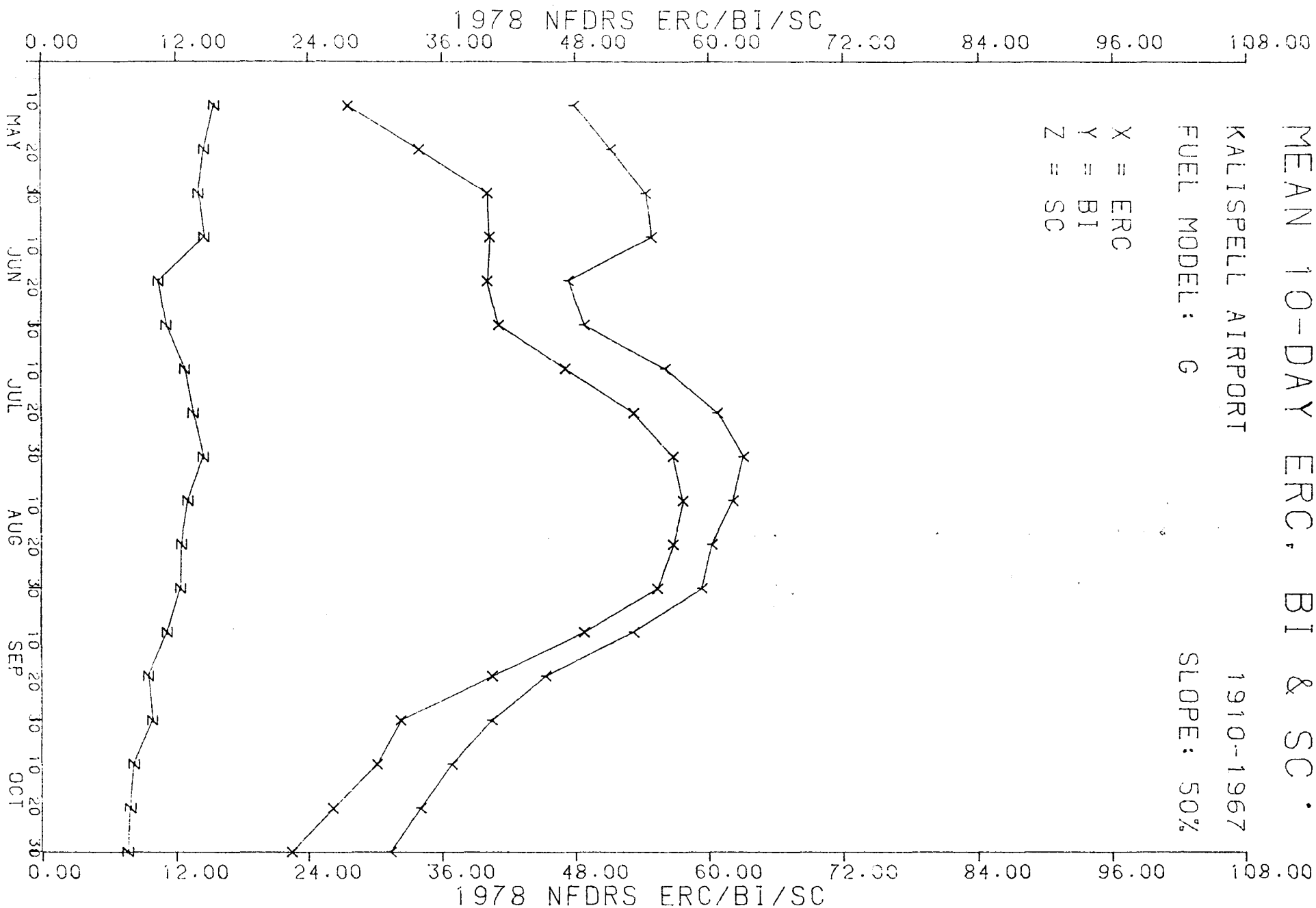
KALISPELL AIRPORT

1910-1967

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC



Appendix C

Yearly Seasonal Plots of ERC, BI, and SC at Miles City.

1910
1914
1917
1918
1919
1920
1925
1926
1929

1910 - 1929

Initial FM1000 = 25% (Climate class 3)

MEAN 10-DAY ERC, BI & SC

MILES CITY AIRPORT

1910-1910

FUEL MODEL: G

SLOPE: 50%

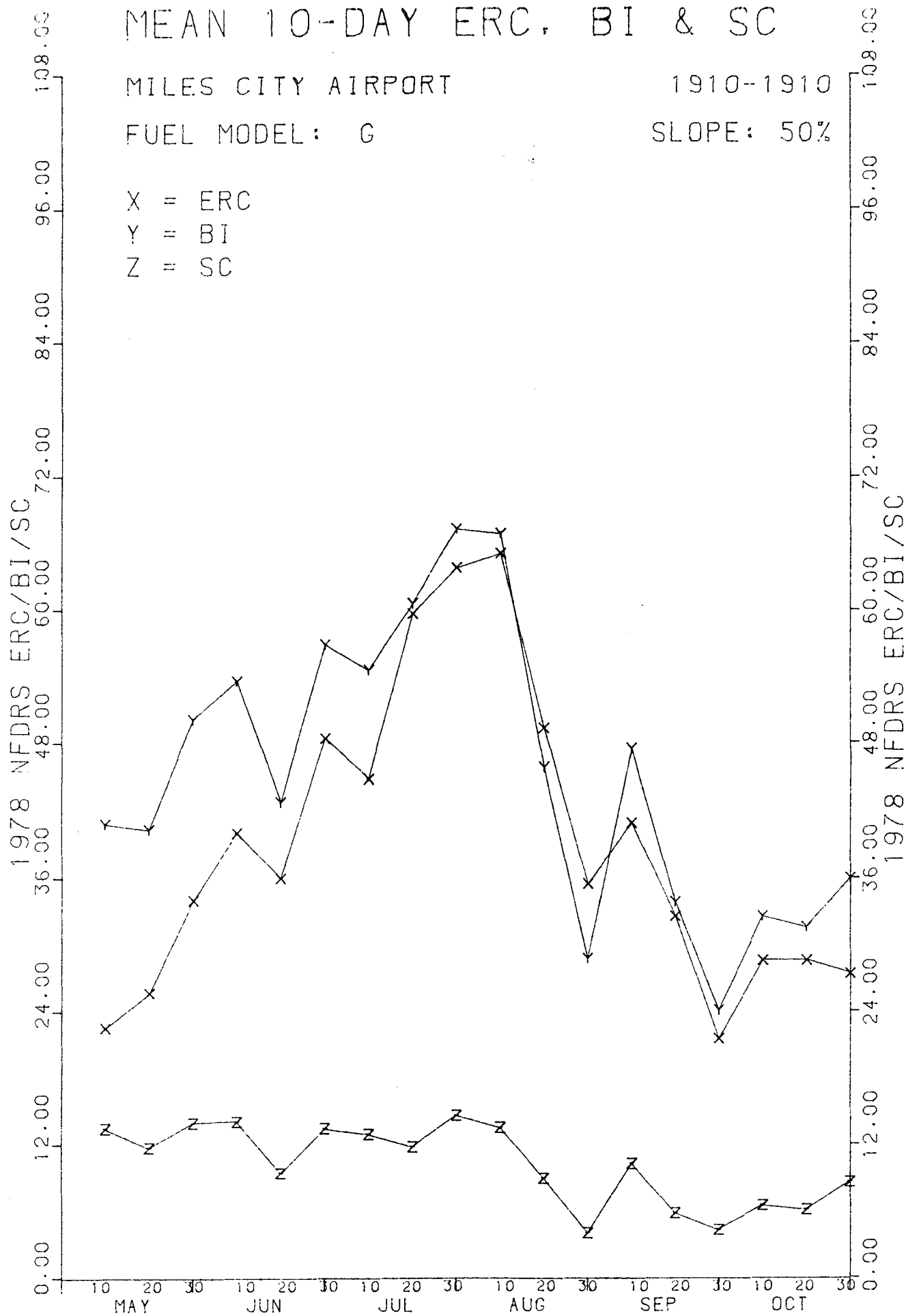
X = ERC

Y = BI

Z = SC

1978 NFDRS ERC/BI/SC

1978 NFDRS ERC/BI/SC



MEAN 10-DAY ERC, BI & SC

MILES CITY AIRPORT

1914-1914

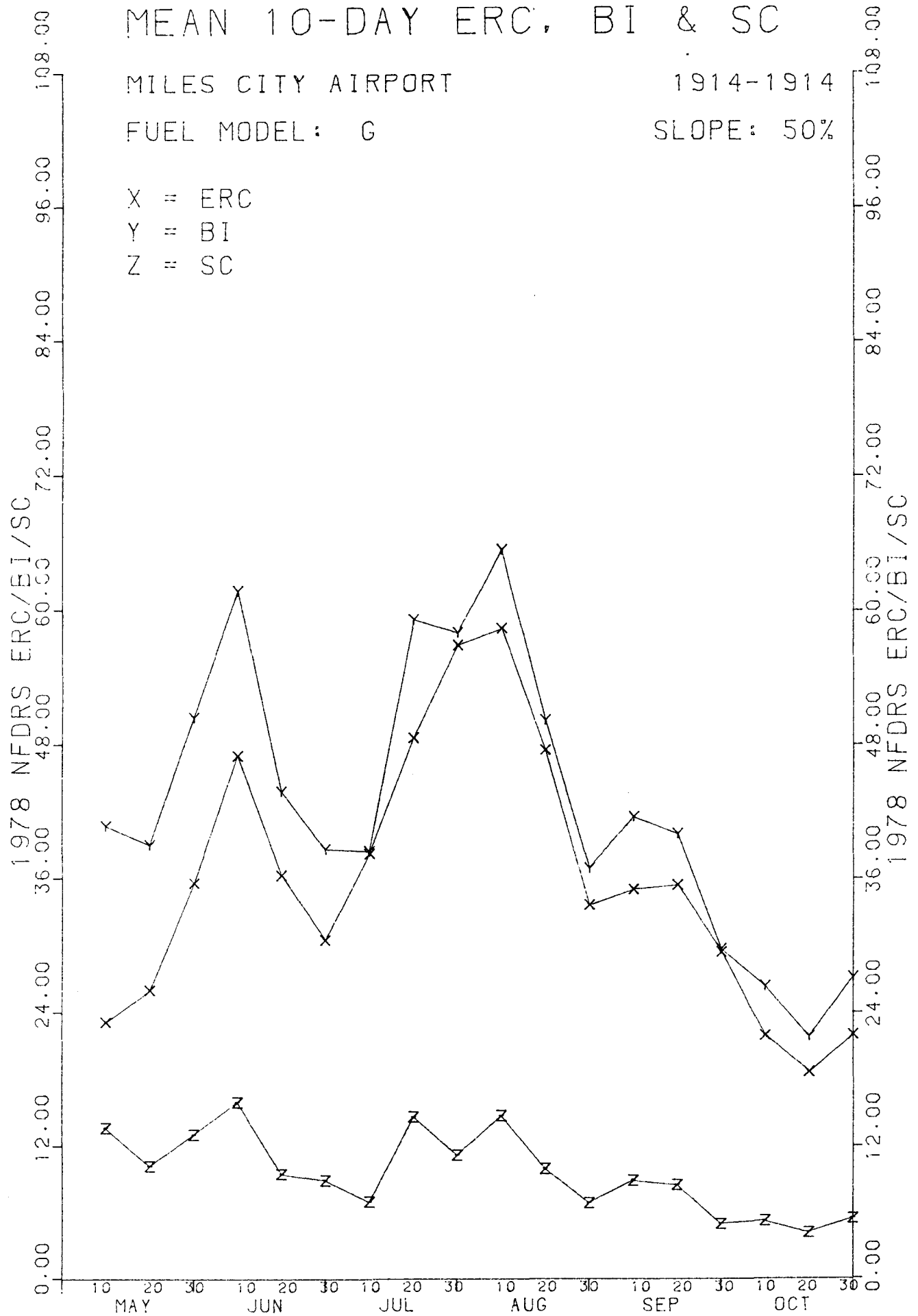
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

MILES CITY AIRPORT

1917-1917

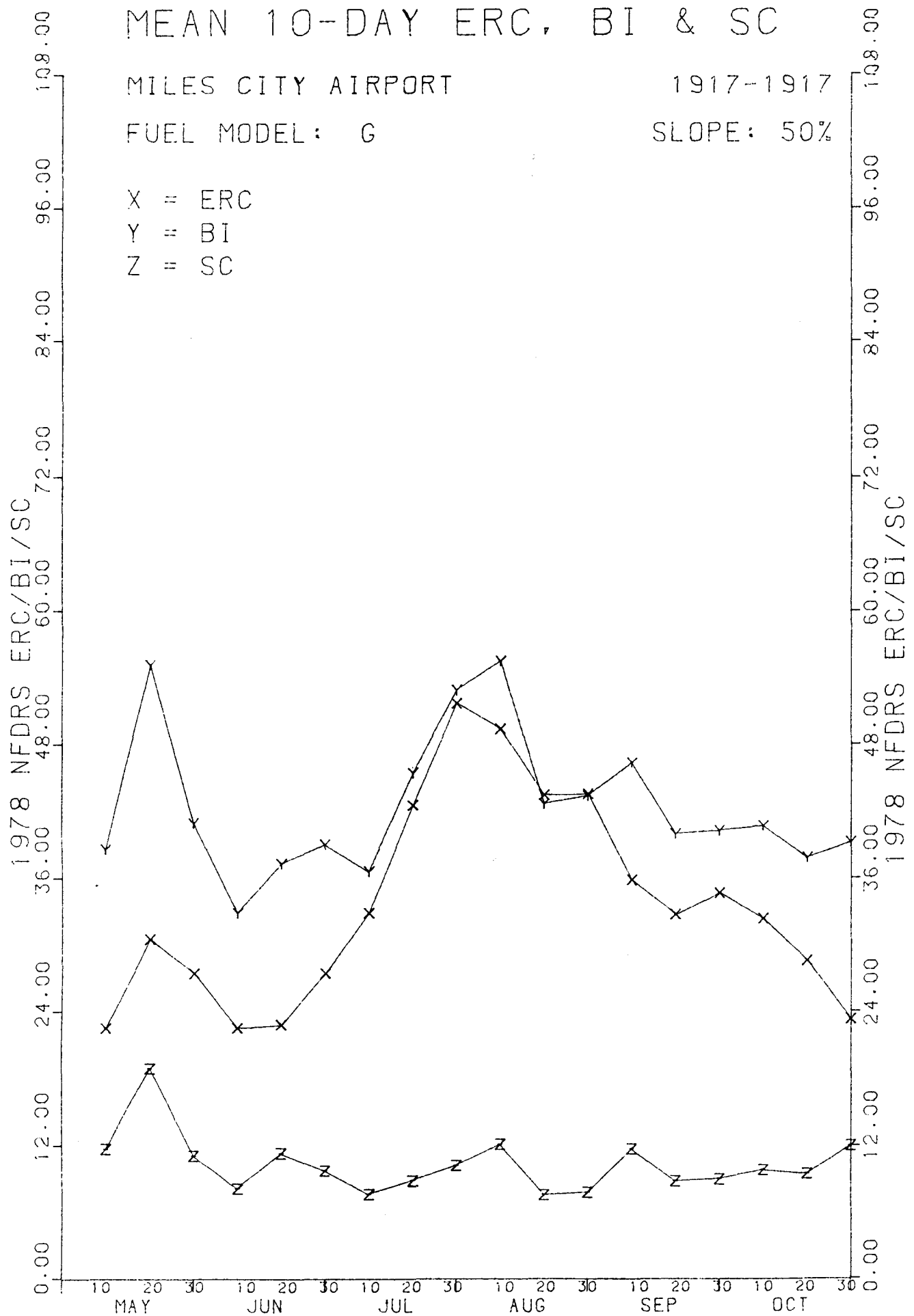
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

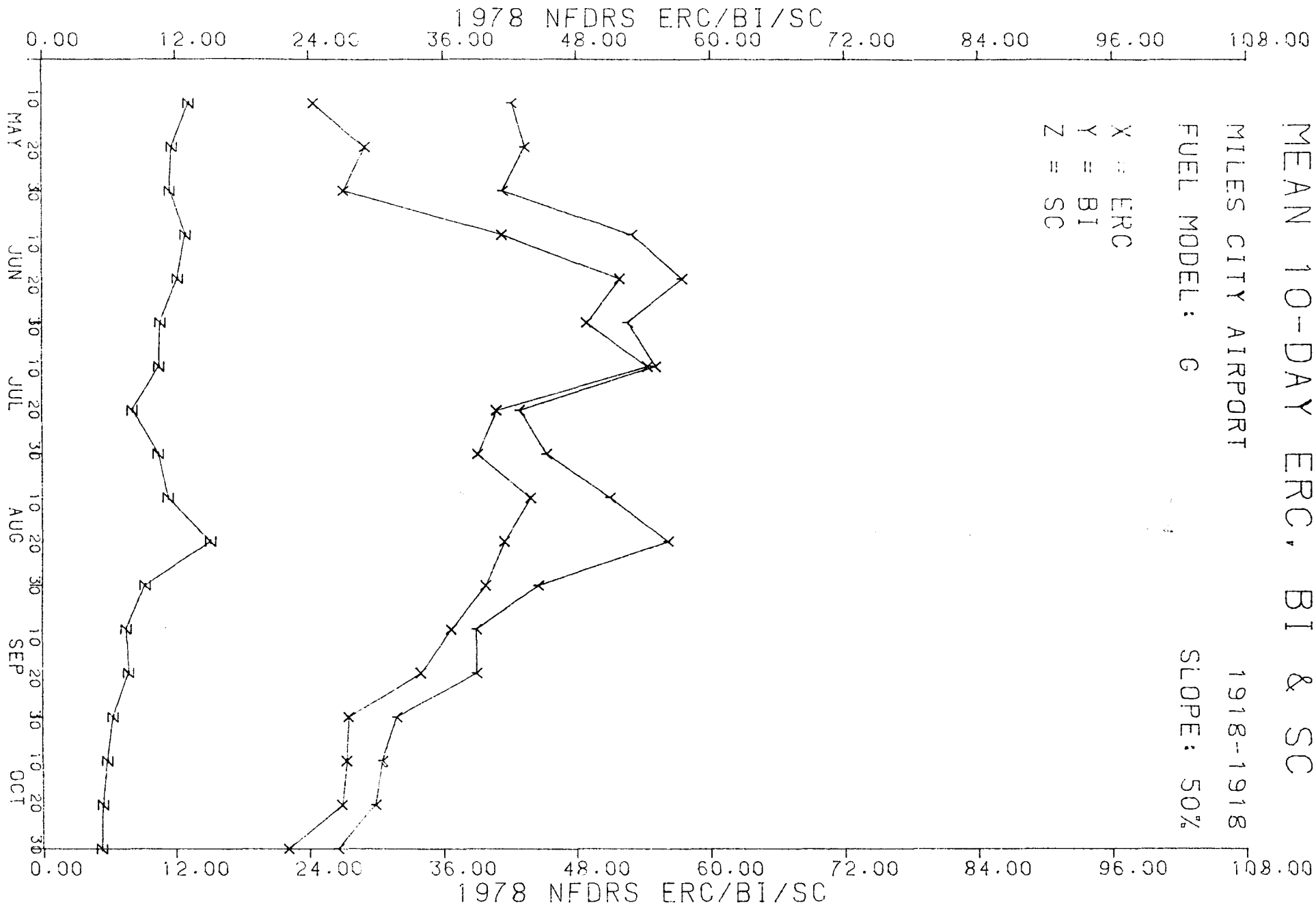
MILES CITY AIRPORT

1918-1918

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC



MEAN 10-DAY ERC, BI & SC

MILES CITY AIRPORT

1919-1919

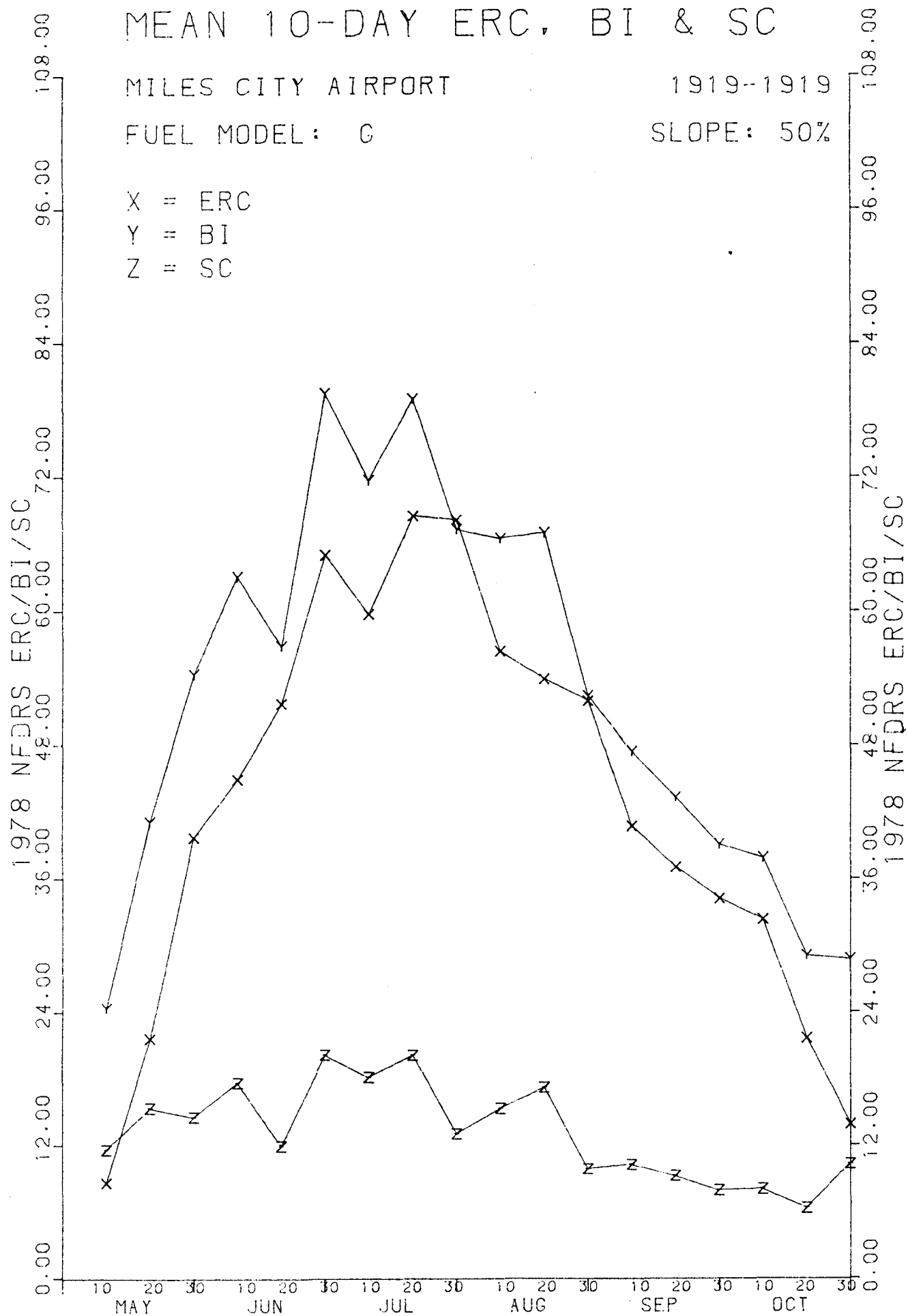
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

MILES CITY AIRPORT

1920-1920

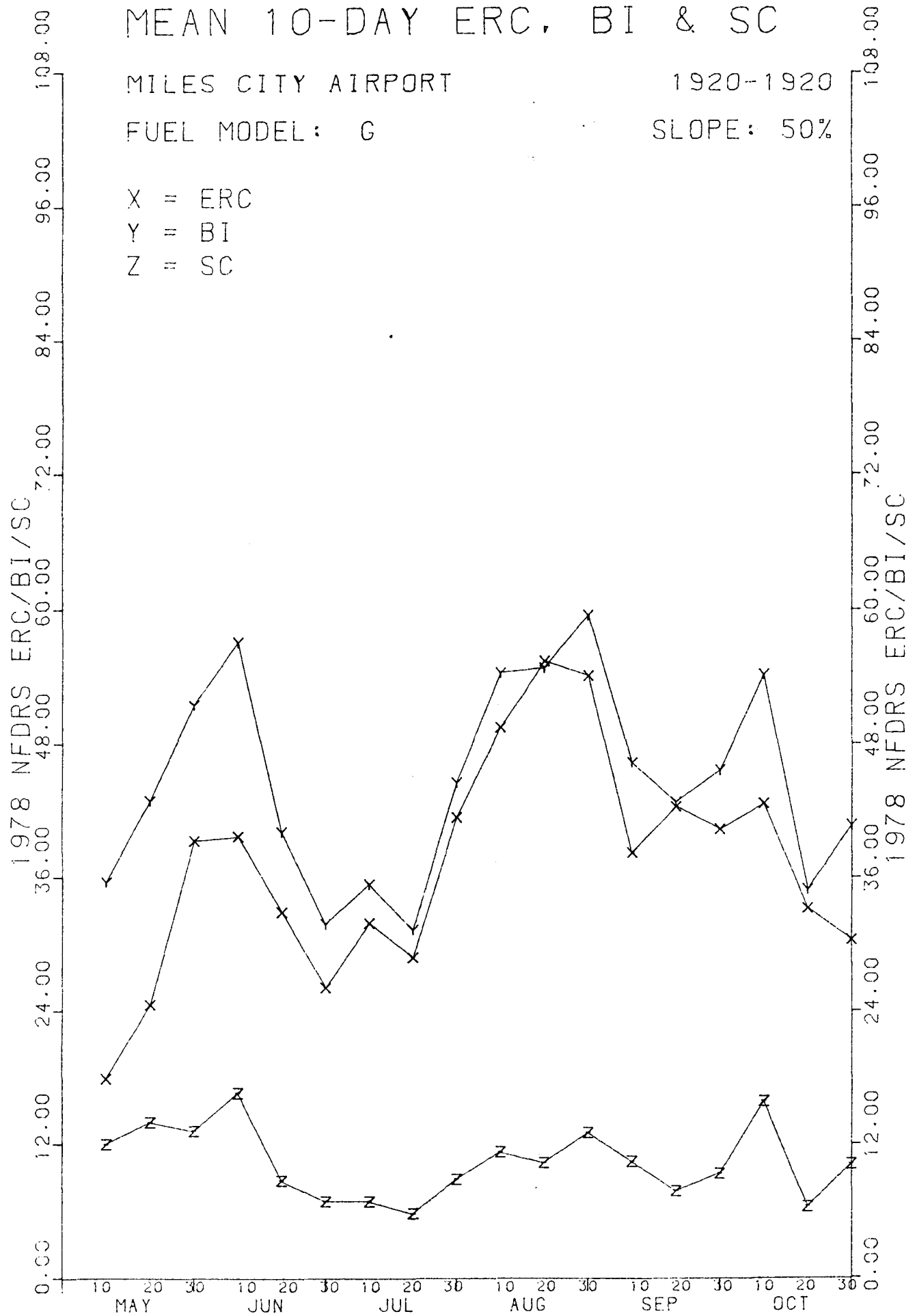
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

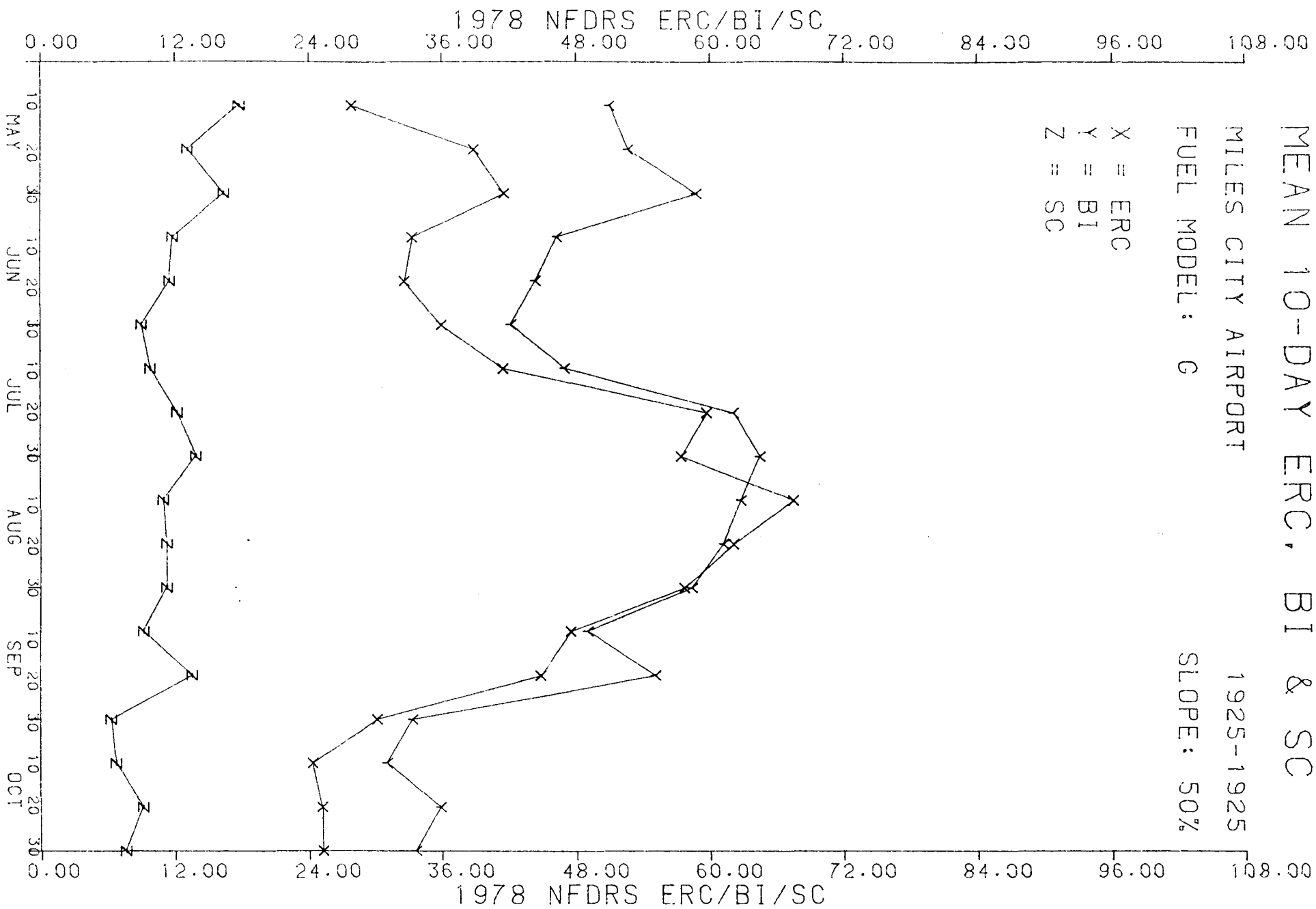
MILES CITY AIRPORT

1925-1925

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC



MEAN 10-DAY ERC, BI & SC

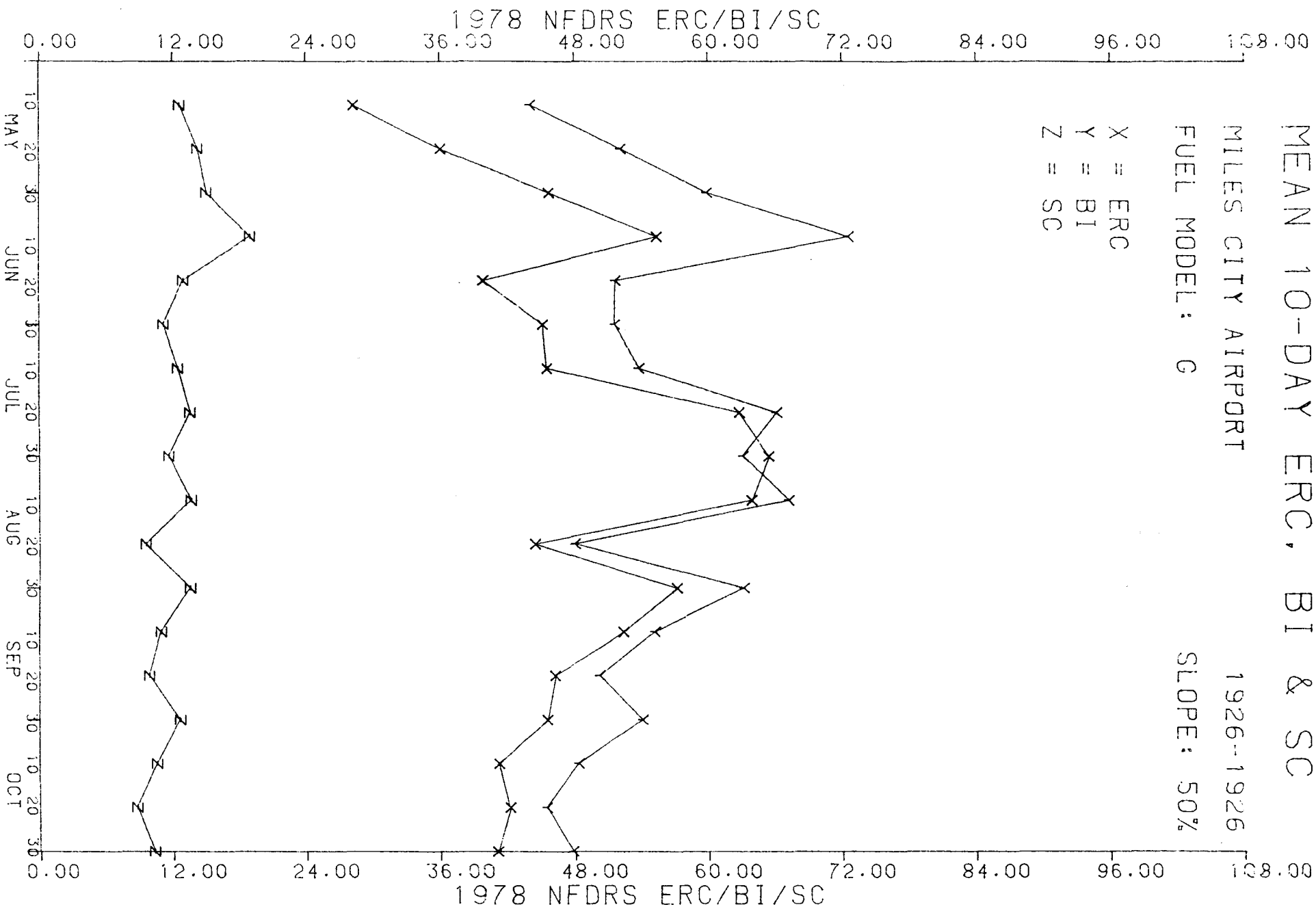
MILES CITY AIRPORT

1926-1926

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC



MEAN 10-DAY ERC, BI & SC

MILES CITY AIRPORT

1929-1929

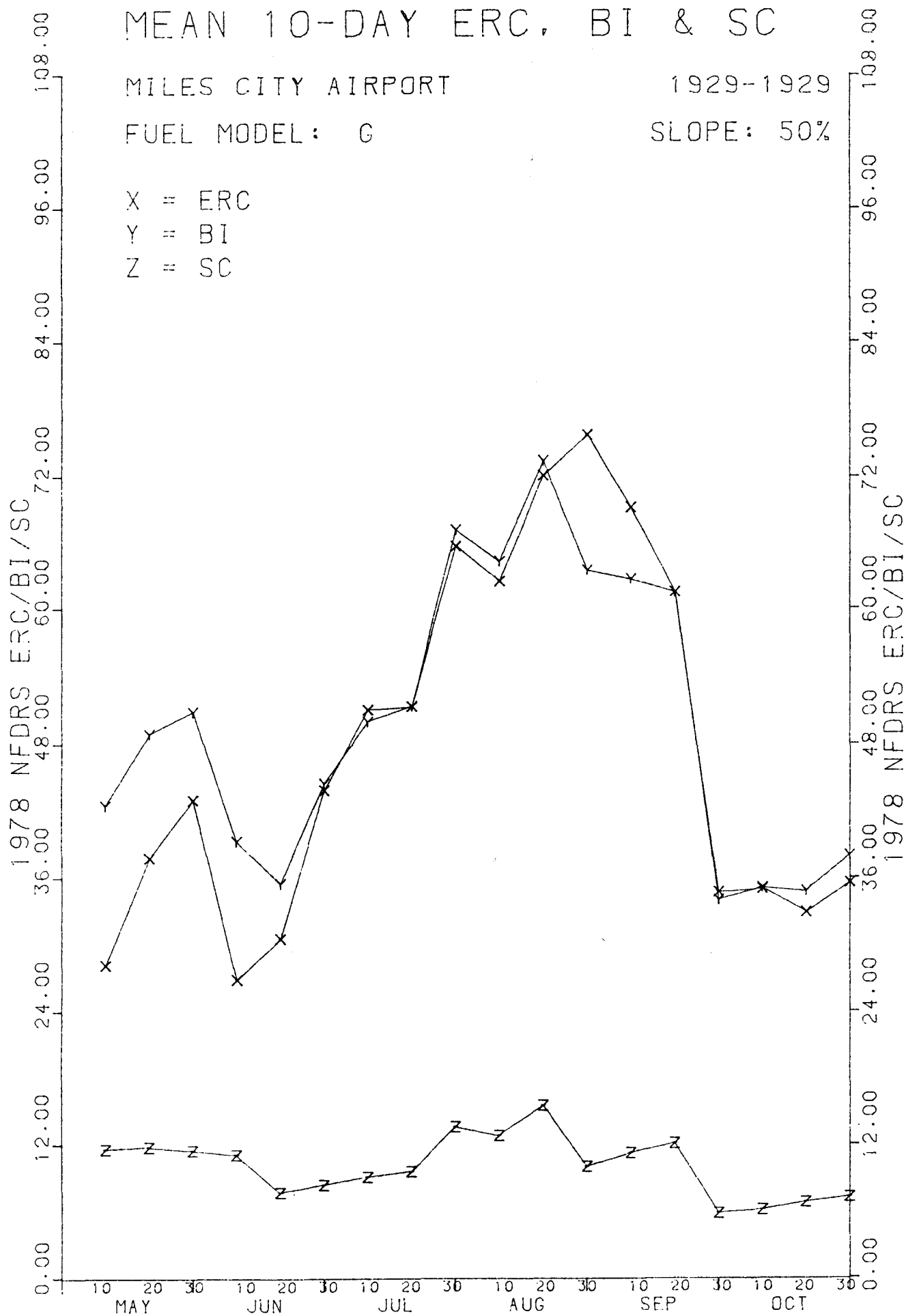
FUEL MODEL: G

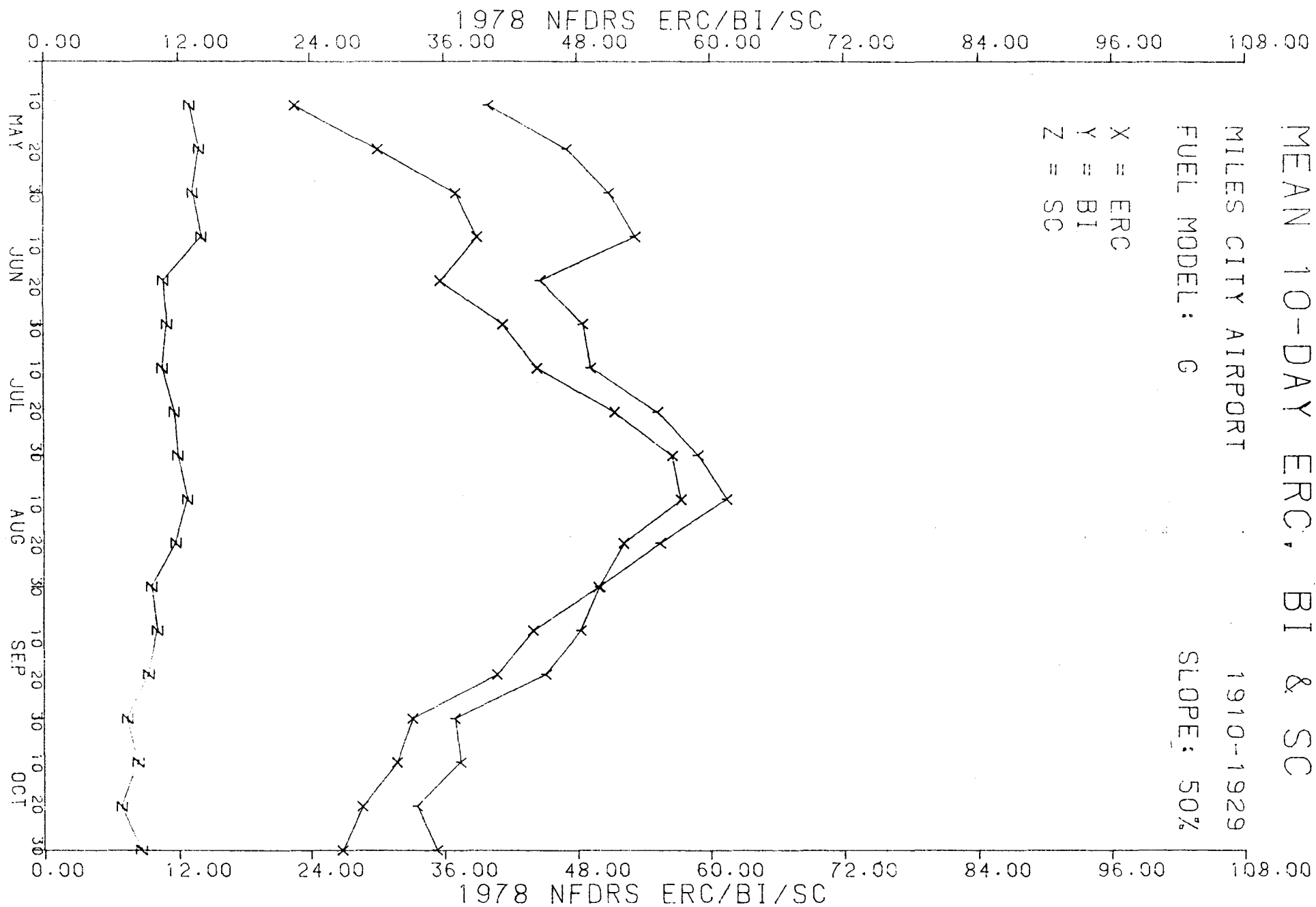
SLOPE: 50%

X = ERC

Y = BI

Z = SC





Appendix D

Yearly Seasonal Plots of ERC, BI, and SC at Yellowstone Park.

1910

1914

1917

1919

1920

1925

1926

1929

1931

1934

1910- 1934

MEAN 10-DAY ERC, BI & SC

YELLOWSTONE PARK

1910-1910

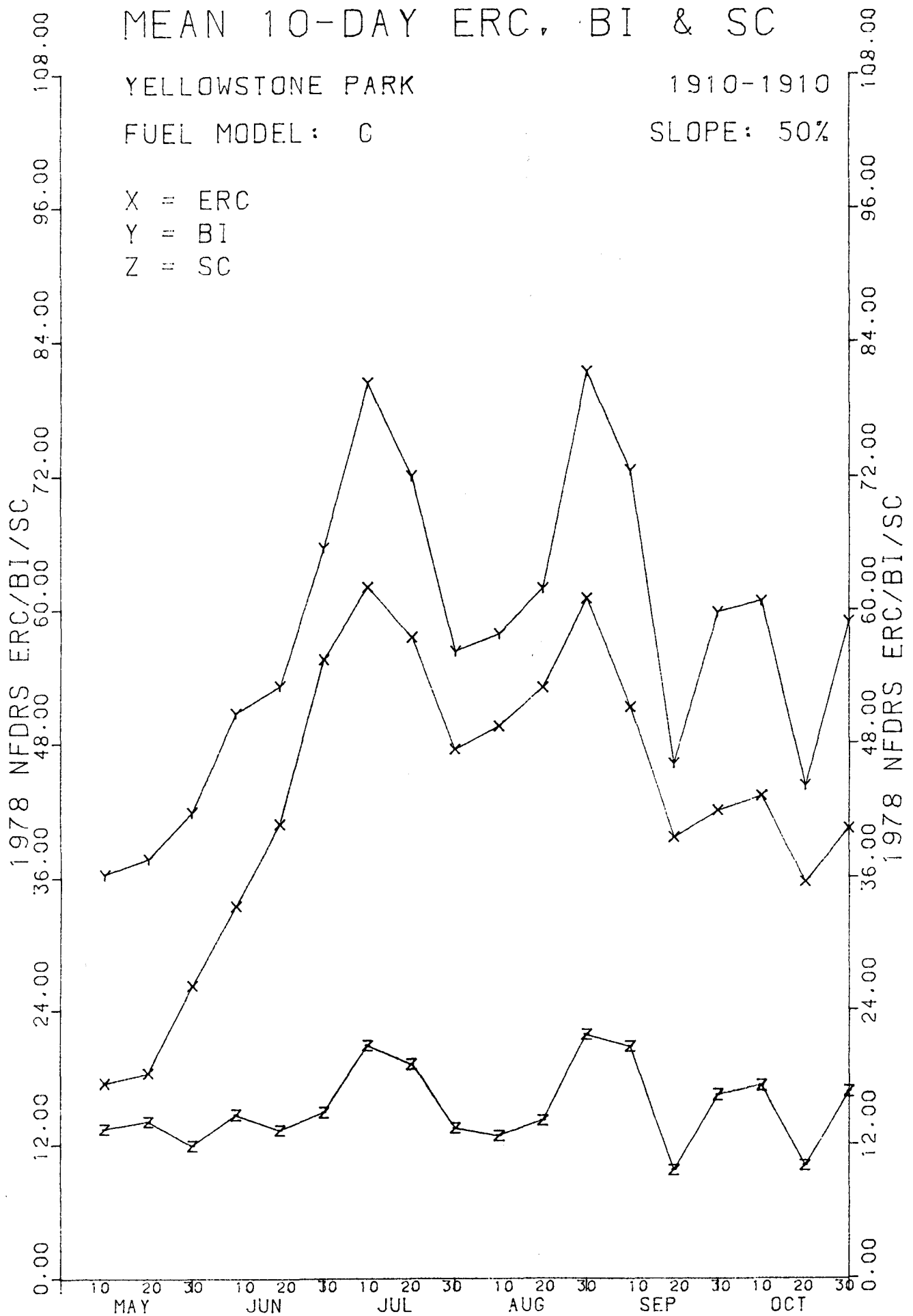
FUEL MODEL: C

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

YELLOWSTONE PARK

1914-1914

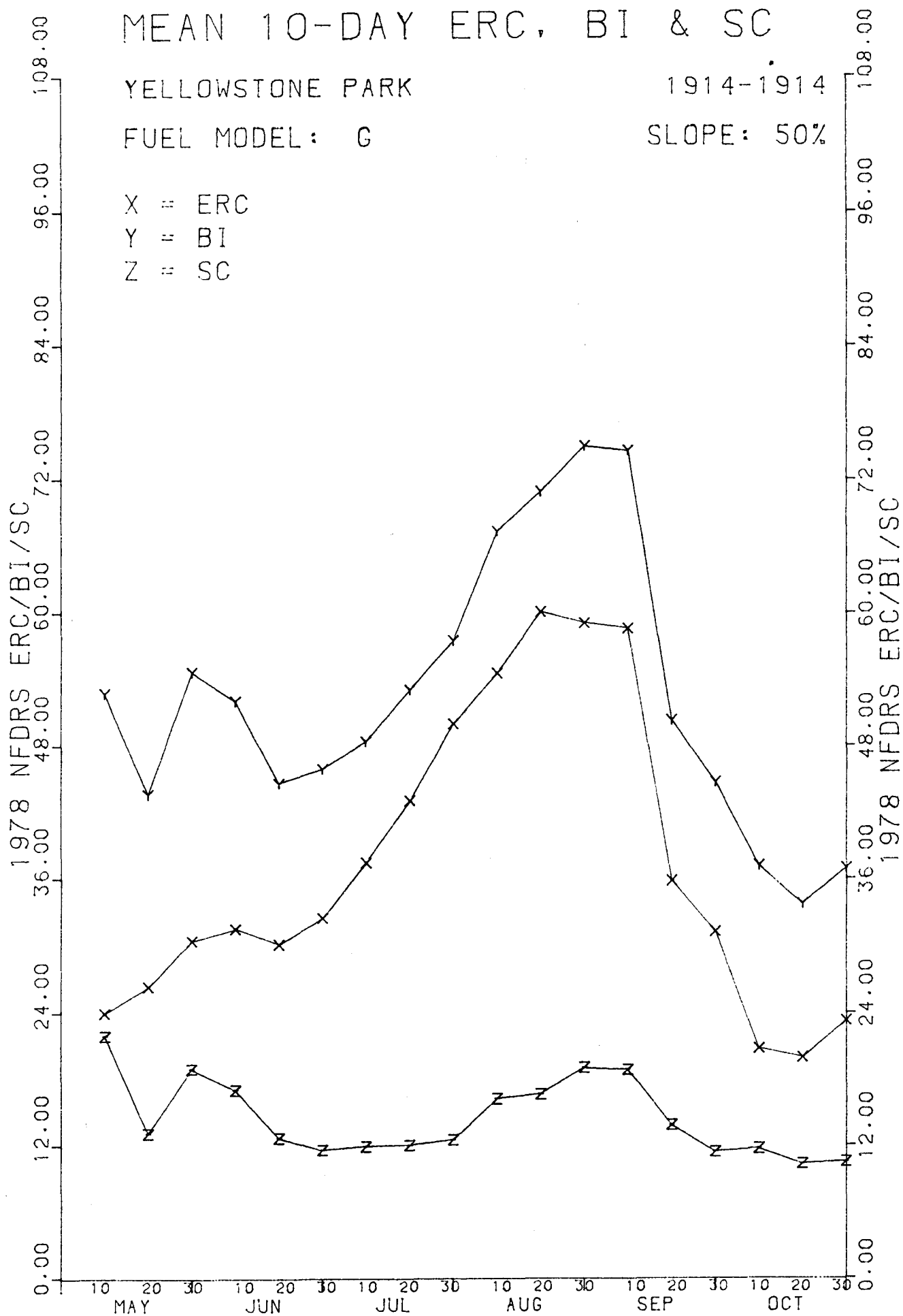
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

YELLOWSTONE PARK

1917-1917

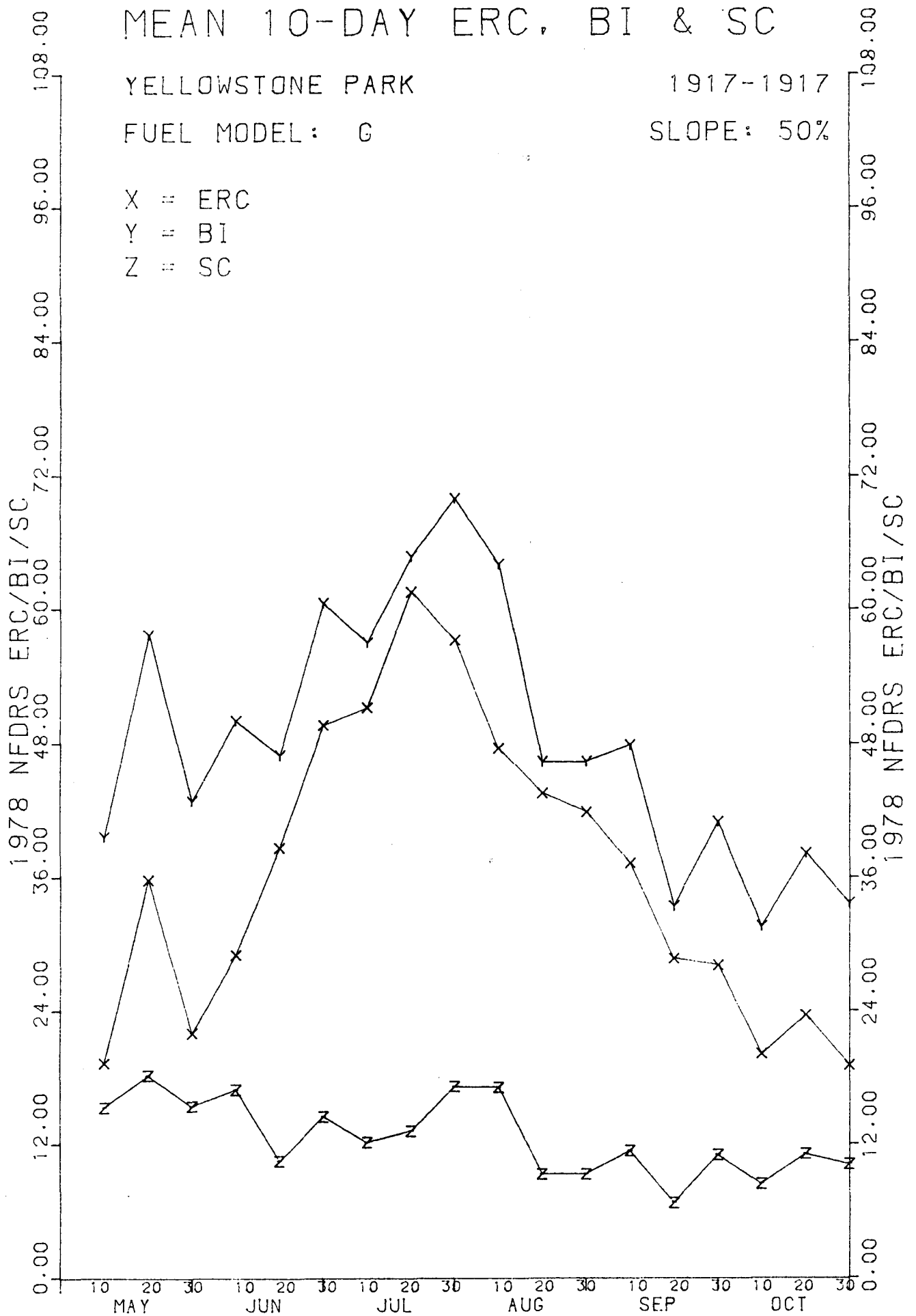
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

YELLOWSTONE PARK

1919-1919

FUEL MODEL: G

SLOPE: 50%

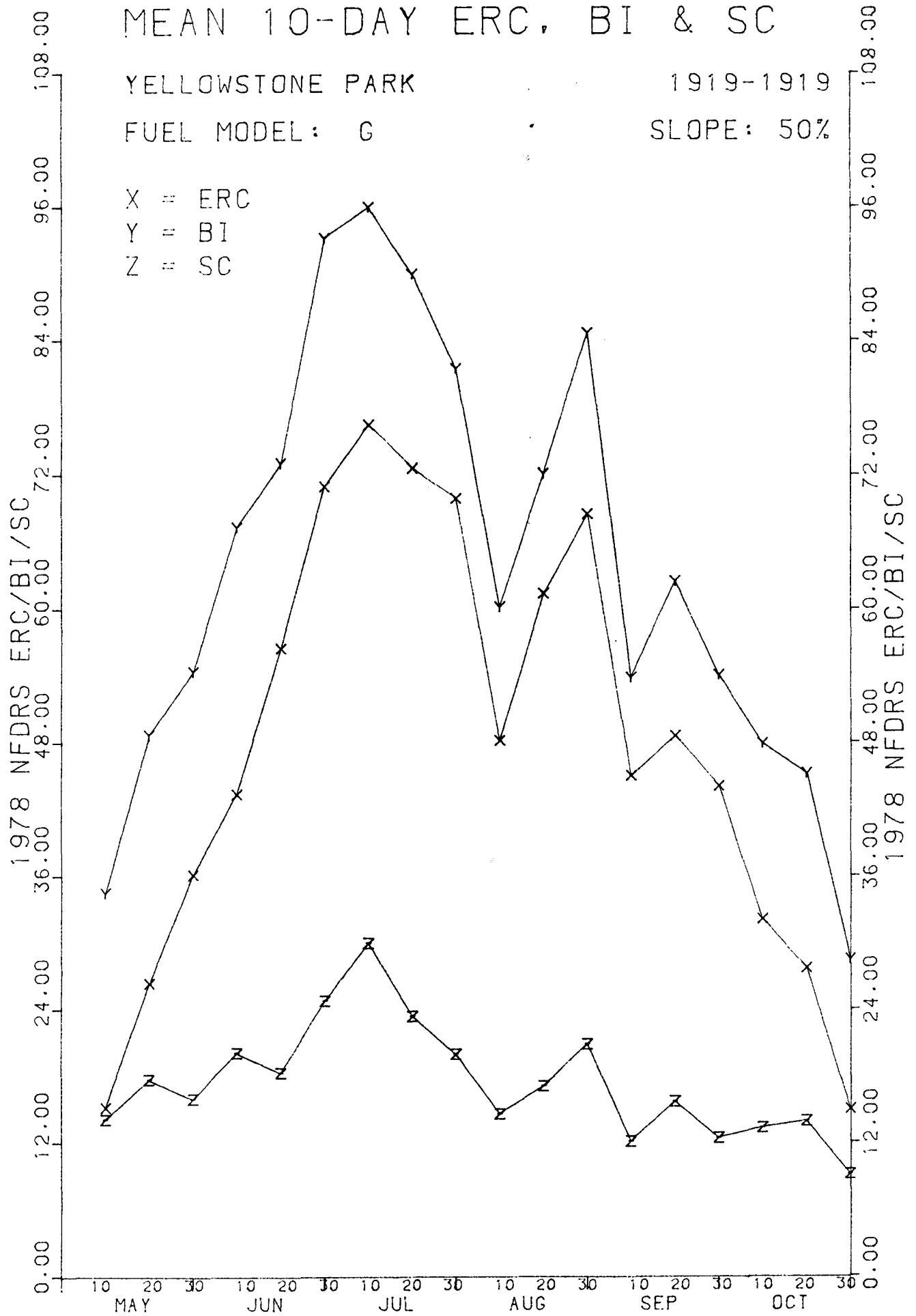
X = ERC

Y = BI

Z = SC

1978 NFD RS ERC/BI/SC

1978 NFD RS ERC/BI/SC



MEAN 10-DAY ERC, BI & SC

YELLOWSTONE PARK

1920-1920

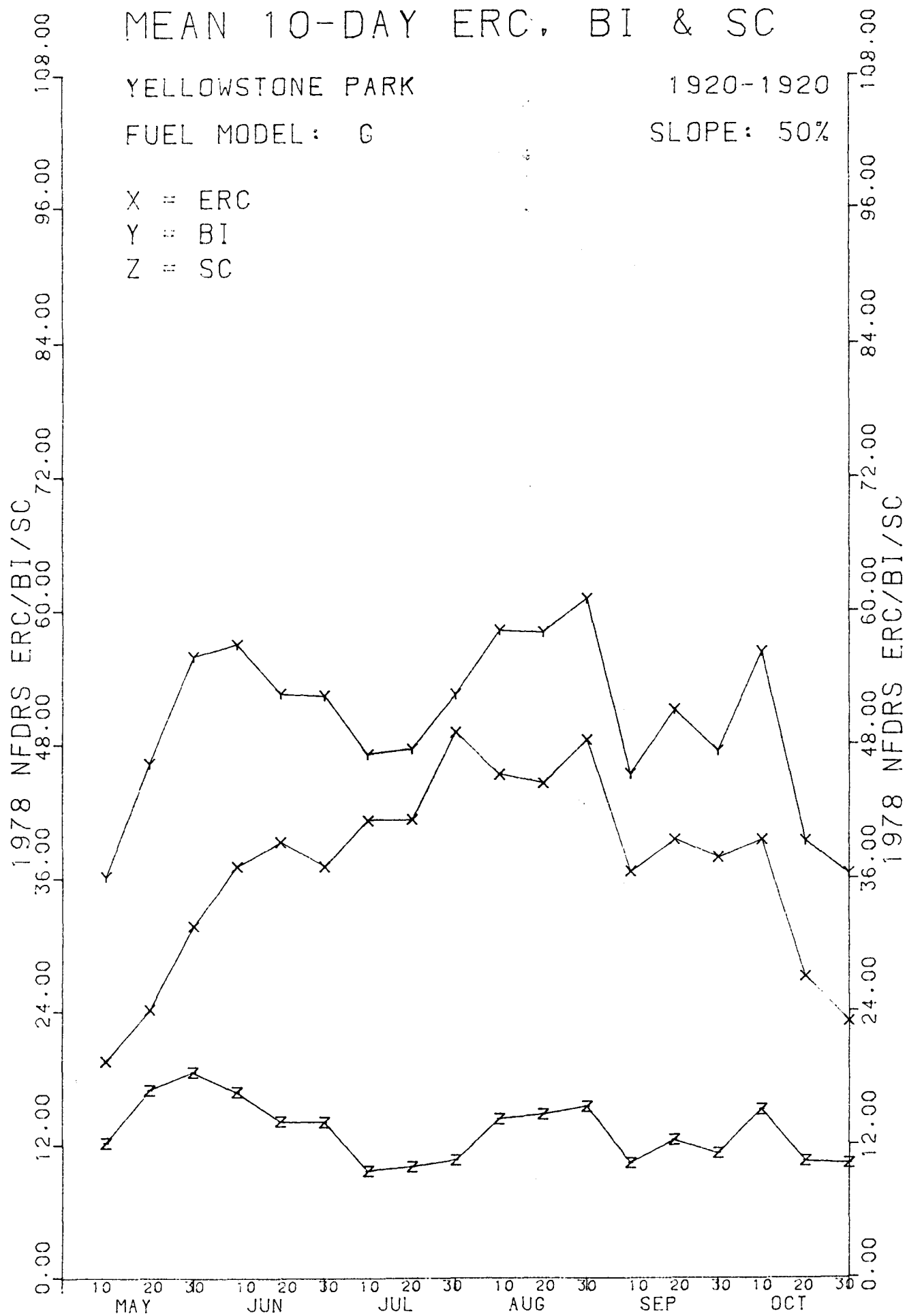
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

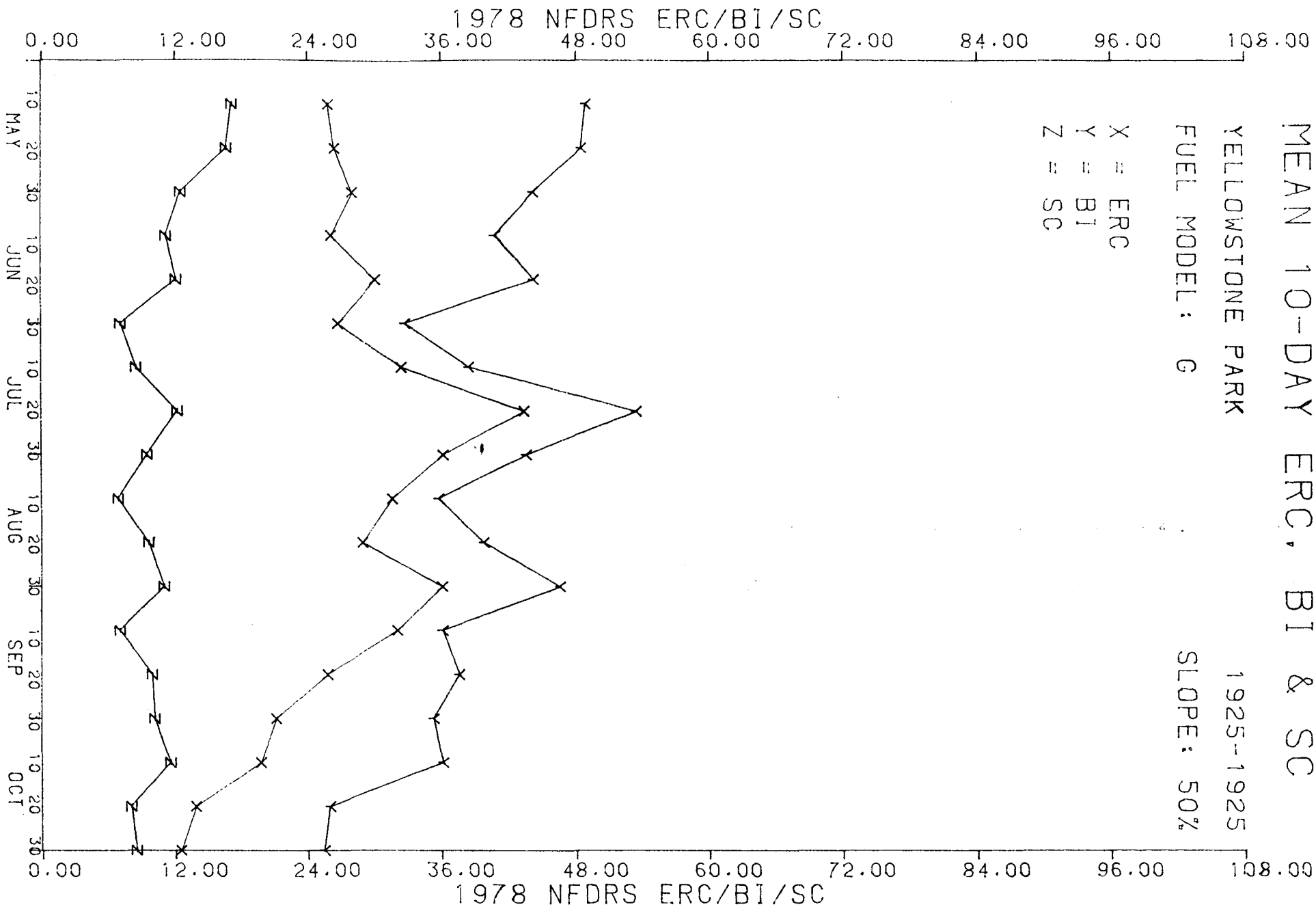
YELLOWSTONE PARK

1925-1925

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC



MEAN 10-DAY ERC, BI & SC

YELLOWSTONE PARK

1926-1926

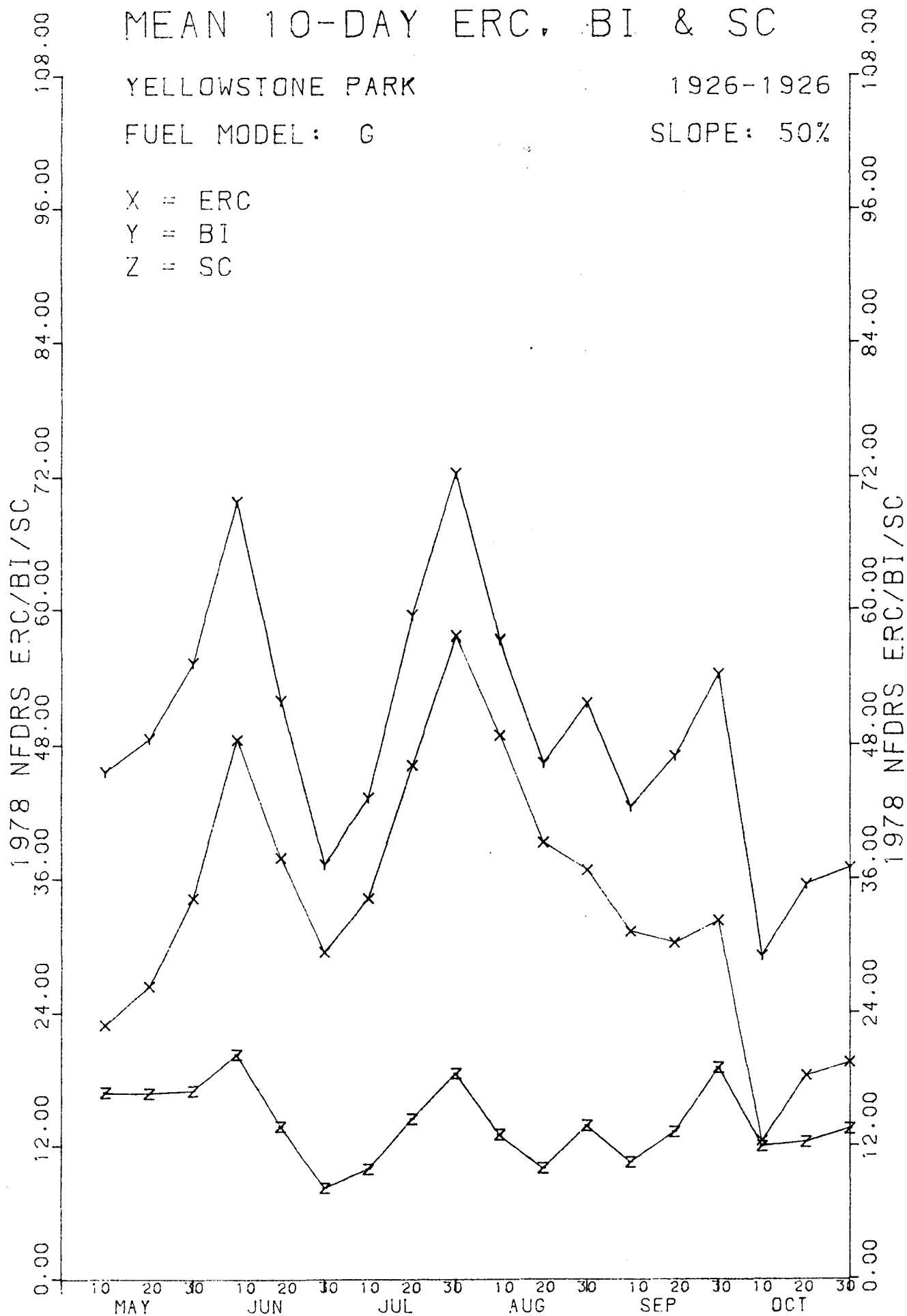
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



YELLOWSTONE PARK

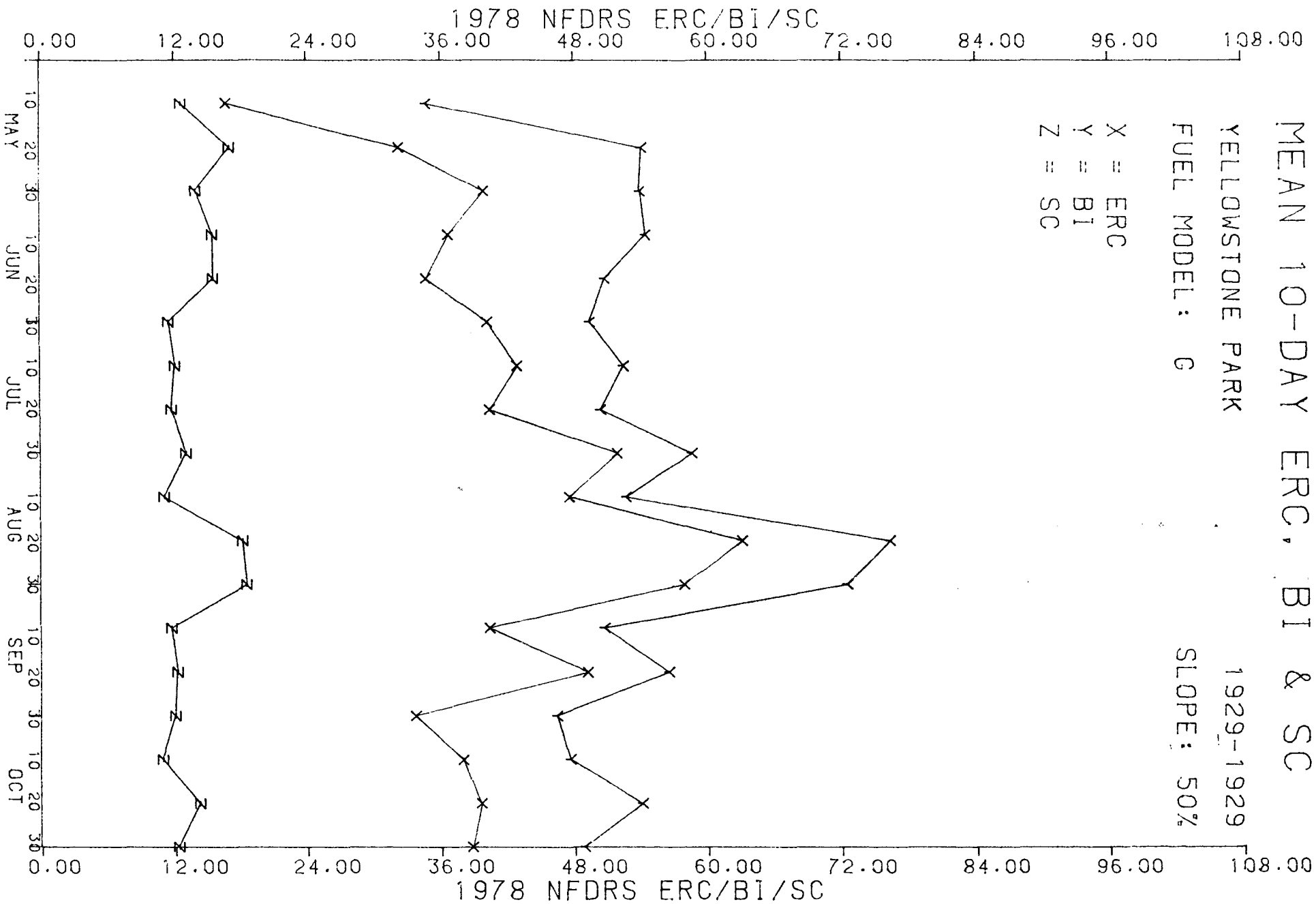
1929-1929

FUEL MODEL: G

SLOPE: 50%

X
=
ERC

113

$$Z = SC$$


MEAN 10-DAY ERC, BI & SC

YELLOWSTONE PARK

1931-1931

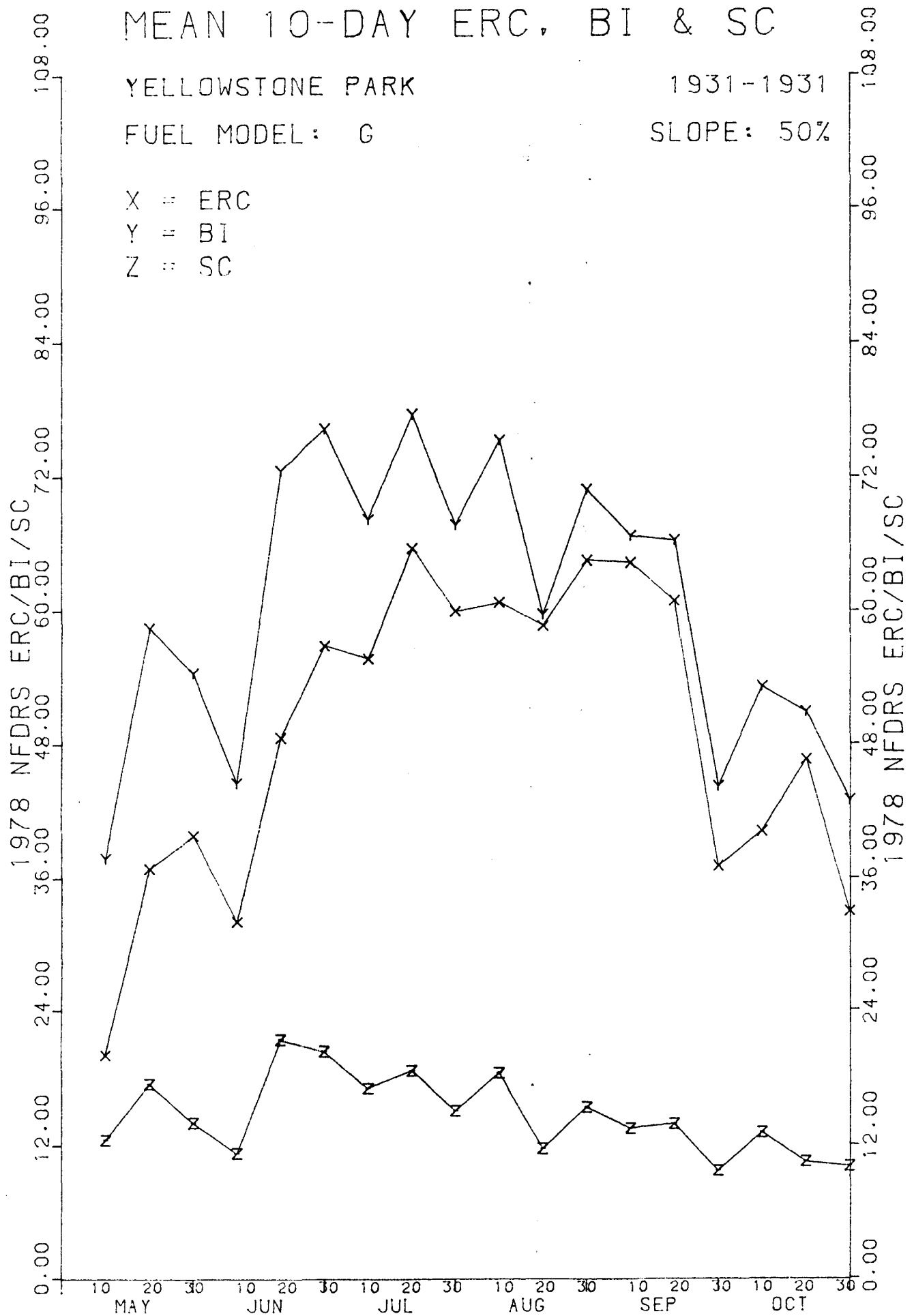
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

YELLOWSTONE PARK

1934-1934

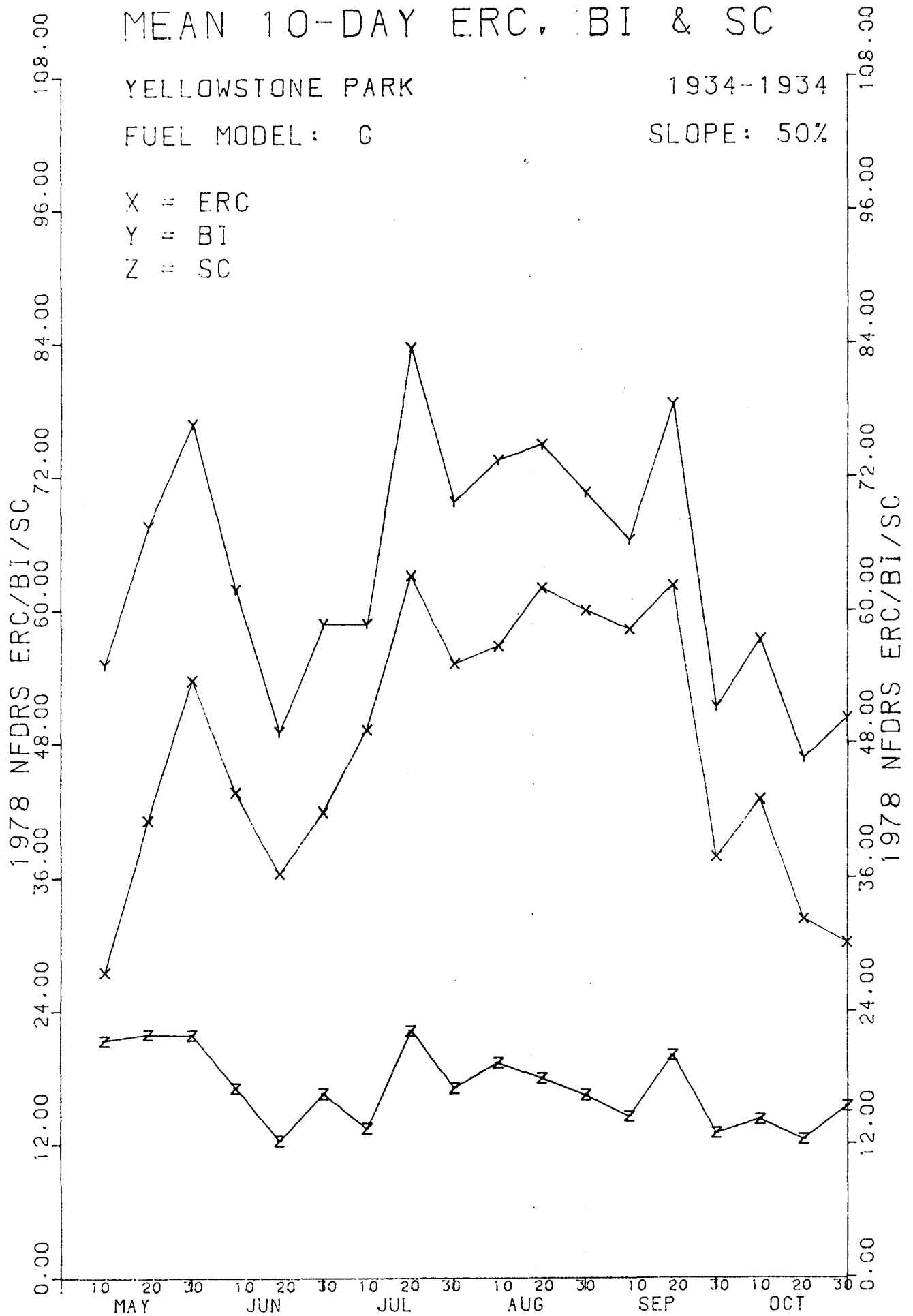
FUEL MODEL: G

SLOPE: 50%

X = ERC

Y = BI

Z = SC



MEAN 10-DAY ERC, BI & SC

YELLOWSTONE PARK

1910-1934

FUEL MODEL: G

SLOPE: 50%

X = ERC
Y = BI
Z = SC

